DRAGON USER



The independent Dragon magazine

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GEC plays its peripheral hand

Getting down to databases

Relocatable machine code

Play Survival

Win Ikon Computer's Ultra Drive



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How to submit articles

The quality of the material we can publish in *Dragon User* each month will, to a very great extend, depend on the quality of the discoveries that you can make with your Dragon. The Dragon 32 computer was launched on to the market with a powerful version of Basic, but with very poor documentation.

Every one of us who uses a Dragon will be able to discover new tricks and quirks almost every day. To help other Dragon users keep up with the speed of the development each of us must assume that we made the discovery first — that means writing it down and passing it on to others.

Articles which are submitted to *Dragon User* for publication should not be more than 3000 words long. All submissions should be typed. Please leave wide margins and a double space between each line. Programs should, whenever possible, be computer printed on plain white paper and be accompanied by a tape of the program.

We cannot guarantee to return every submitted article or program, so please keep a copy. If you want to have your program returned you must include a stamped, addressed envelope.

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Editorial

PROBLEMS WITH SAVING and loading software have long beset users. The reason we've not been able to recommend any particular cassette decks is that manufacturers sometimes change component suppliers. So one deck might work for us, but not for you if its manufacturer has decided to buy components elsewhere in the meantime.

But now help is at hand, and electrics giant GEC is the unlikely St George. Its subsidiary GEC McMichael, which took over UK sales of Dragon Data products earlier this year, is to introduce a cassette deck specifically designed to be compatible with the 32/64. Other peripherals are also on their way, and the tie-up leaves Dragon Data free to develop more micros and strengthen its software catalogue. It also raises the tantalising possibility of the Dragon being linked to other GEC McMichael products — intelligent telephones (or even satellite dishes) for receiving data, and monitors for displaying it. This may remain a dream, but it's good to dream pleasantly.

The tie-up should also help to calm doubts about Dragon Data's future. Last year the company hit some patches of bad financial publicity, but it could have done more in terms of promoting its products to offset this. For example, by its very title the Dragon 64 was pitched against the Commodore 64. Dragon Data might have been better prompting buyers to consider which micro offered the most user RAM rather than emphasising the "64" similarities. Or it could have explained that for all its graphics facilities, the Commodore 64 loses out to the Dragon in terms of graphics commands.

As another example, promoting microcomputer architecture looks suspiciously like building houses of cards. Sinclair's QL, with a Motorola 68008 at its centre, is being marketed as a 32-bit machine. But if our recollections of the Motorola catalogue are accurate, that chip certainly has an internal 32-bit architecture, but externally it's still 8-bits. Similarly we think the much publicised "16-bit" IBM PC, with an Intel 8088, has only 8-bits externally. Going back to the Motorola catalogue, and to the Dragon, the 6809 is also 8-bits externally — and has a good many internal 16-bit features as well.

The real breakthrough will come when input/output (external) matches processing power (internal). Acorn is said to be working on incorporating such a 32-bit chip, National Semiconductor's 32032. But then on the other hand National Semiconductor is also rumoured to be having problems delivering that chip. In the end Acorn's ambitions may have to rest with the 16032. Interestingly Acorn is also expected to be offering the Xenix operating system. Now Xenix is a Unix-lookalike, as is OS9, the operating system Dragon Data has opted for. It's a shame that all these lookalikes couldn't be exactlyalikes — that would certainly put paid to many of the software problems at the higher end of the user scale.

Letters

This is the chance to air your views — send your tips, compliments and complaints to Letters Page, *Dragon User*, 12-13 Little Newport Street, London WC2R 3LD.

In search of Users

HAVING TRIED everywhere for an October issue of *Dragon User* and having met with no success, I am now going to the source itself, in desperation.

If you are able to provide this issue, I would be most appreciative, and if you would let me know the cost, with postage, I shall be glad to send my remittance by return.

G Tuck
Bournemouth

UNFORTUNATELY we've sold out of back issues of the May, June, August and October 1983 editions of the magazine. However, other back copies are available, price £1 each, which covers administrative costs and package and postage.

Please send a cheque or postal order, made payable to *Dragon User*, marking your envelopes: *Dragon User* (Back Issues), 12/13 Little Newport Street, London WC2R 3LD. And in case you didn't realise, the first edition of the magazine came out a year ago this month, which makes this month our birthday.

Easier interfacing

I AM NOT normally moved to comment on other people's published articles, but, after reading "The Easy Way To Interfacing" in your February issue, I could contain myself no longer.

Mr Nanson's use of a 74LS125, to stop the clock to the ZN427 A to D whilst a start conversion strobe is sent, is not required. As both the 6522 VIA and the ZN427 are clocked by E (pin 6 of the Dragon cartridge port), both devices will be in synchronisation and therefore the start conversion strobe will always be in sync.

His suggestion that a separate 5 volt supply be used, rather than running the risk of overloading the Dragon's PSU, is unnecessary. I can assure your readers that the Dragon has enough power in reserve to cope with the few devices used in this design. There are Dragon add-on units, such as disk controllers, that have many more devices in them, and these units derive their power from the cartridge port without any problems.

During the setting up procedure of the ZN427, one is expected to apply voltages of plus 4.94 and minus 4.98. How are the majority of people expected to supply such accurate voltages without a lot of bother, or the use of fairly expensive equipment? A more satisfactory solution to the setting up procedure would be to have a bi-polar output derived from the ZN426 D to A convertor (for more details send a large sae to *Dragon User*, marked Interfaces). This could be accurately calibrated with a digital multimeter, a common instrument these days, and this voltage source fed back into the ZN427 for it's calibration.

A great deal of effort seems to be used in "manufacturing" an extension piece. Tandy stores throughout the country sell a prototype board (Cat. no. 276-163) which has a 40-way edge connector at each end. These connectors can easily be wired together to form the extension piece, but, as the board has ample room for all the devices, the circuit could be constructed upon it.

E. Stancliffe
Wallasey
Merseyside

THE ARTICLE'S author, A G Nanson, replies: Originally it was my intention to base the interface on an ADC 0804 which has an internal clock. When switching to the faster Ferranti device, which requires an external clock, it would appear that I misinterpreted the data sheet. Hence the presence of the 74L5125 chip which, as Mr Stancliffe points out, is not really necessary. My apologies to anyone who has been put to any inconvenience. If the 74LS125 is omitted, the interface should still work with the program unmodified.

It is quite obvious from the comments, that I did not make myself particularly clear on the point of a separate power supply. Perhaps, what I should have said was that when building your own interfaces it is, in my opinion, better to provide your own power supply.

I appreciate that the circuit described is unlikely to overload the Dragon's PSU and also that there are numerous commercially built and tested interfaces such as disk controllers, I/O ports and the like that rely on the Dragon's PSU without overloading it.

However, in the unlikely event of one's machine being damaged by a commercial interface that develops a fault, the computer owner has some grounds for redress. The owner who builds his own interface is in a less fortunate position, for short circuits and the like do occur even in the most carefully constructed designs, as those acquainted with Mr Murphy's famous law will testify. Consequently, is it not better to run the risk of damaging your own PSU rather than the computer's? Also, the use of a separate PSU provides for greater flexibility of operation, and for future expansion.

Mr Stancliffe asks: "How are the majority of people expected to supply such accurate voltages without a lot of bother or the use of fairly expensive equipment?" — then proceeds to give one answer to his question.

Perhaps another answer would be to use a variable regulated voltage supply and a digital multimeter, the latter being, as your correspondent points out, "a common enough instrument these days".

Most home constructors have amongst their equipment some form of variable regulated voltage source for reasons which are surely obvious. These devices are not all that expensive or difficult to build, as reference to the Maplin catalogue or to R A Penfold's instructive book, Power Supply Projects (Bernard Babani Publishing Ltd.) will indicate.

One must surely presume a certain degree of knowledge on the part of the would-be constructor and it did not appear to be a problem beyond the ability of any keen enthusiast to solve.

According to Mr Sutcliffe: "A great deal of effort seems to be used in 'manufacturing' an extension piece". No! Not particularly difficult with the aid of the transfers mentioned in the article. I did point out that it was my solution to the problem of accessing the Dragon's cartridge port, and obviously, as such, does not preclude anyone adopting an alternative solution whether it be supplied by Tandy's or from any other organisation.

A G. Nanson
Hucclecote
Gloucester

LISTing in confidence

I FOUND the technique for disabling the LIST command (Dragon Answers: March '84) most interesting. However, it does not provide a satisfactory answer to the need for confidentiality.

The LIST command is only disabled when the program is RUN. It would still be possible to LIST the program immediately after loading, and before it is RUN. It would only provide a satisfactory answer if an AUTO-RUN facility were available.

These comments would equally apply to attempts to prevent pirating of a program by disabling the CSAVE command.

M R Maggs
Norwich

Bad files

THE OM article in the March edition of *Dragon User* appeared with incorrect captions and references to the diagrams, resulting in confusion in column three of page 33. The reference to diagram 3 in column 3 should be to diagram 2. And the captions on page 37 should read: diagram 2: layout of simple variables storage, diagram 3 the seven overhead bytes of an array table.

Software Top 10

1	(1)	**The King**	Microdeal
2	(–)	**Ugh**	Softek
3	(2)	**Eightball**	Microdeal
4	(8)	**Cuthbert in the Jungle**	Microdeal
5	(9)	**Devil Assault**	Microdeal
6	(–)	**Hungry Horace**	Melbourne House
7	(–)	**Frogger**	Microdeal
8	(–)	**Space Shuttle Simulator**	Microdeal
9	(–)	**SAS**	Peaksoft
10	(7)	**Grand Prix**	Salamander

Chart compiled by Websters Software

OASIS SOFTWARE

present . . . TWO NEW RELEASES

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A rapid step forward in Home Programming.

The newly released 1.1 upgraded compiler written by Dr. David Gray for Dragon 32 and 64 owners. By converting your own BASIC programs into intermediate code, Sprint accelerates them by up to 5 or even 10 times their normal running speed. Supporting virtually all the integer BASIC and cassette and printer commands, Sprint programs are not only compiled from tape but also run independently of the compiler.

PETITE PASCAL

Not just a language – an education in structured programming.

This extended integer subset of the structured programming language is the ideal introduction, not only to a language widely used in schools and universities but also to programming itself.
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OASIS SOFTWARE

Oasis Software, 9a Alexandra Parade, Weston-super-Mare. Tel: 0934 419921

Please send me
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PETITE PASCAL £14.95 ☐

I enclose cheque/PO for £________

Name________

Address________



DRAGON 32 & 64

DRAGON CHESS

- Six levels of play.
- All legal chess moves including en-passant, castelling and pawn to queen promotion.
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- Loading and saving of games positions from tape.
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- Sides can be exchanged at any stage.
- Best move hint.
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"...I thought this was an excellent version of the game. Well worth buying." (Home Computer Weekly)

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- Very high standard of play.
- Professional packaging and life-time guarantee.

"Dragonchess is without doubt the best value chess on the market today." (Microdeal)

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REVERSI

At last! Reversi running on your Dragon 32 or 64. 2 levels of play, full instructions and computer demonstration for beginners.

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As well as being one of the best games of skill written for the Dragon 32 and 64 it also has some of the best pure machine code graphics we have ever seen.

DOMINOES

Two games in one with full instructions. Hours of frustrating fun this program has 6 levels of play and on the higher levels adapts its play to its assessment of your ability.

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BACKGAMMON	£5.95 ☐	☐
REVERSI	£5.95 ☐	☐
DOMINOES	£5.95 ☐	☐
INVADER CUBE	£5.95 ☐	☐
MIND GAMES COMPENDIUM	£19.95 ☐	☐

I enclose cheque/PO for £ ______

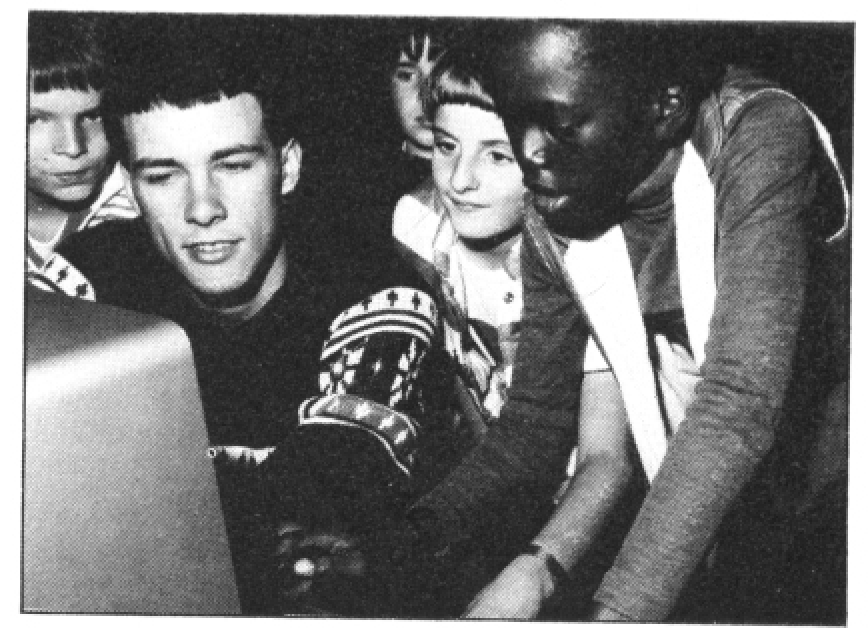
NAME ______

ADDRESS ______

Educated treats from Garland and Dragon Data

MORE educational titles are on their way — from Dragon Data itself and Garland Computing.

Five educational titles for children up to the age of 11 are coming from Dragon Data. Children from Space is a four-part spelling game for four to seven year olds. The first episode introduces some simple spelling tests, and the other parts go on to deal with past and present tense, making sense of jumbled sentences and finally choosing words to insert in sentences.



Dragon software – making inroads into the educational arena

Number Chase for 11 year olds, is an arithmetic number game written by ASK (Applied System Knowledge), responsible for some of Dragon Data's previous educational games.

Shape-up, like the name suggests, enables children to create shapes and images and is aimed at the four- to seven-year-old age group.

Table Adventures (four to 11 year olds) and Facemaker, a creative game for four to eight year olds, rounds up the series.

From Garland Computing comes news of more conversions of its educational software used in schools.

Already on release are six maths cassettes originally launched for the BBC, now repackaged and slightly modified for the Dragon.

Each cassette (price £7 inc VAT) has between three and five programs geared for nine to 12 year olds. Some of the programs, especially the ones involving fractions, have also been used to help remedial children in schools.

The programs use animations and simple games to illustrate mathematical principles. Colin Munn of Garland Computing emphasises that they are not self-tuition exercises, but rather need the overall guidance of a teacher or parent.

For 13 year olds and above Garland Computing is considering marketing Understanding the Human Body and Understanding Physics (£12.95 each).

These programs, already available for the BBC, have been converted to the Dragon. However, they are not yet on general release and Garland is talking to dealers before putting money into packaging the programs.

Colin mentioned that individual orders could be dealt with, but like many other firms, Garland is waiting to see how sales of the Dragon progress before putting money into further developments.



"It's the surprise ending that makes them so popular!"

S-22 aid

THE arrival of the S-22 Toolkit could spell the "start of the end of menu driven programs" according to P F Hazelton of Ashby Computer Centre.

The £40 Toolkit is a "very powerful" machine code programming aid "for use at all levels". It comes complete with plug-in cartridge, action card containing 6809 instruction codes, introduction and appendix books

The S-22 is available direct from Ashby Computer Centre, 186 Ashby High St, Ashby, Scunthorpe.

Speedy storage system

FOR THOSE of you who are fed up fiddling with the volume controls on your cassette recorder and can't bear the thought of seeing another I/O ERROR message flash up in front of you, Ikon Computer Products may have the answer.

Its Ultra Drive is billed as a "reliable, automatic high-speed storage" system at a price only slightly higher than a standard cassette recorder and well below the cost of a disk drive.

The Ultra Drive has a read/write speed of 1,200 characters a second (said to be 10 times as fast as a cassette recorder) and a capacity of approximately 200K per cassette. The Drive uses miniature, data certified cassettes (the same size as those used in a dictaphone).

Ikon will guarantee for one year any cassettes purchased from it (though falling short of you stamping on them).

Audio quality cassettes can also be used on the Ultra Drive, but David Tucker of Ikon warns that the quality of these, when used with the Drive, is variable. He suggests that "you buy one and test it thoroughly before buying others".

The Ultra Drive costs £79.95 inclusive of interface, cables, operating system, micro-cassette and VAT, add £3.45 for p&p.

It is available direct from Ikon Computer Products, Kiln Lake, Laugharne, Dyfed SA33 4QE (tel 099-421 515). The cassettes cost £3.36.

Ikon's products are not available in the shops as they have "dropped retailers in order to keep the price down as low as possible".

And while on the subject of storage systems, Phi Mag Systems is launching a new data storage system, Phloopy. Unfortunately, at present this is only available for the BBC, though the company will be making a decision soon on which machines to extend the system to.

While acknowledging that the Dragon has sold well in the past, the company is adopting a wait-and-see attitude.

Wars, fantasies and adventures . . .

THE RANGE of fantasy and strategy games for the Dragon is increasing.

Two of Dragon Data's games, Calixto Island and Black Sanctum, already available in text versions, are to be re-released as animated graphics adventures, and two other games, Sea Quest and Shenanigans, are new adventure titles.

Sea Quest involves searching for buried treasure and in Shenanigans you have to follow the rainbow to find the pot of gold at the end.

Also coming are two new arcade games. Fruity, a high-res machine code game, is, as the name suggests, about a fruit machine and Bumpers involves extracting yourself from a maze. Useful extras like the ability to make yourself invisible add sparkle to the game.

Finally, from Lothlorien comes news of Johnny Reb, its best-selling war game for the Spectrum, and recently converted to the Dragon. Johnny Reb (price £6.95) is a game for one or two players. After selecting sides and forces (comprising cavalry, artillery and infantry units) the screen changes from text to hi-res graphics.

A river separates the two forces and a standard is shown on each side of the river. The object of the game is to capture the enemy flag or alternatively to annihilate the opposition.

Super Writer

CARTRIDGE word processing is the latest business tool from Dragon Data. Its Super Dragon Writer 2, at £39.95, has all the usual editor commands and gives you a choice of screens. There is the 32 by 16 format screen, or, at the expense of 6K, you can use a high-res screen with upper case and lower case letters with true descenders.

With the hi-res screen you can choose four formats, one of which, the higher level, 85 by 25, is used for windowing to see the overall shape of the text as it will appear.

And on the utility front, Dragon Data is planning to release a disk version of the Dream system (text editor, assembler, monitor and disassembler). The program's author says this is the first assembly for the Dragon Data disk system with the facility to assemble directly from disk and to build up a library of subroutines.

Airwaves

CHIP SHOP listeners are going to have a choice of suppliers for the Basicode converters needed to run the radio broadcasts.

Last month we announced that the BBC was to release a Dragon converter, but Grosvenor Software claims to have pipped Radio 4 to the listening post.

Mike Kerry of Grosvenor Software explained that his Dragon Basicode was available now at the same price as the BBC's.

The Basicode is a complete receiver system, allowing users to record the VHF radio broadcast from the BBC on to a tape, and then play the tape into the Dragon under the control of the Basicode system, converting it to Basic.

The system includes a library of Basic subroutines to implement all the standard features of Basicode and a facility to support a 24-line by 40 character display. The standard Dragon screen acts as a window, and facilities are available to scroll the screen.

The Dragon Basicode is available from Grosvenor Software, 22 Grosvenor Road, Seaford, East Sussex BN25 2BS.

MODE 5

SOFTEK HAS announced the release of its new utility MODE 5 which allows simultaneous use of text and graphics on the same screen.

The utility (price £6.95) is a feature which brings the Dragon into line with other micros as this mode is the one Dragon Data omitted from the Dragon.

Dragon network

IT'S NOW possible to network Dragons using a control unit from the Irish software company Lazersoft.

Its tape driven system — consisting of a "black box", separate power unit and cables — can handle up to eight Dragons. But other boxes can be added to increase that number. The price for the Dragon Network System is about £70 in the United Kingdom.

Kevin Carr explained that the system's ideal application was in schools, where a teacher could pace programs to meet individual users' needs while keeping an eye on their progress.

Lazersoft is also working on ways to link the Spectrum into the network so that a mix of machines can be controlled.

To back up this educational drive, Lazersoft is releasing a £50 geographical tutorial on disk, covering the world in hi-res, with breakdowns on all its continents and countries. Two geographical cassettes are also available at £7.95 each, covering Ireland and Europe.

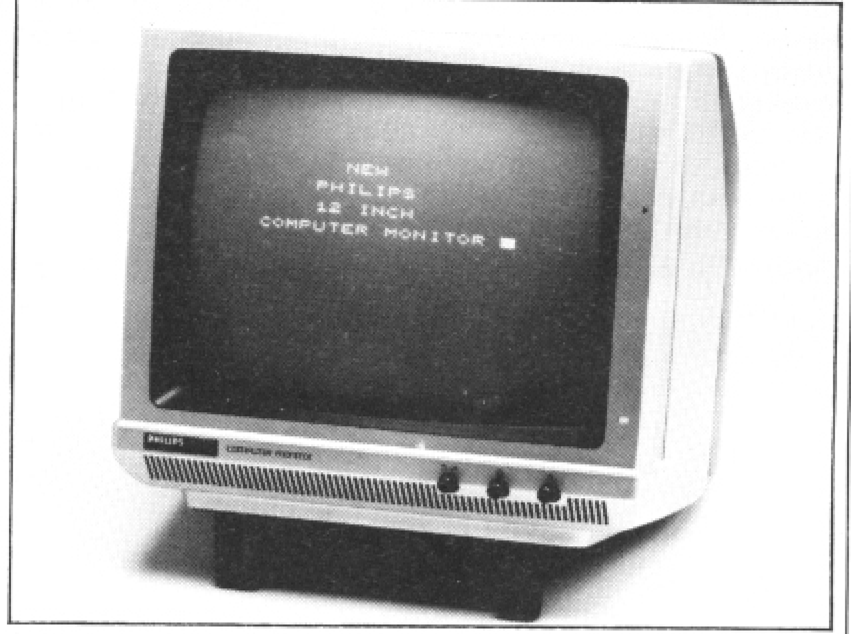
But Lazersoft is not ignoring the business market. Its disk based Super File Management System, at £55, provides over 150K for storing information with up to 240 characters per record. You can search the database in various ways: single condition, double conditions ("and" as well as "or"), record number, and date or numeric.

It handles vertical and horizontal printing, as well as labels. Its word processing facility allows standard letters to be printed once merged with database items.

Spreadsheet functions are also included. As Kevin points out this gives the system a range of applications from keeping parish records to running a small business.

Also available, but on cassette, are KD Base at £9.95, storing up to 500 records; Stock Control at £10 more, recording information on up to 600 lines; and VAT Analysis, also £19.95, which handles up to 700 invoices.

For more details contact Lazersoft at 7 Proby Square, Blackrock, County Dublin.



A NEW HIGH resolution 12-inch computer monitor has been launched by Philips for £69.95. Although Philips has not actually tested the monitor with the Dragon, it has two sockets at the back, one of which is a separate synch connector for composite video (as on the Dragon) and the other of which is for RGB. The monitor (the Philips V7001) has a green phosphor tint to reduce eye-strain, an adjustable stand and an anti-glare tube to help cut down reflection.

Each month we write about one particular club — if you think yours should be featured here write to Clubs Page, *Dragon User*, 12-13 Little Newport Street, London WC2R 3LD

The ranging role of the ACC

An introduction to the ACC by its chairman **Rupert Steel**

ARE you a member of a computer club? Have you visited your local club? Do you know where your local computer club is? If the answer to all these questions is "no", then you may be missing out on something which may breathe life and interest into your Dragon.

Computer clubs come in three varieties. There are national user groups, local computer clubs and closed computer clubs. The national user groups are associations of users of a particular computer system, and they tend to operate largely by a postal newsletter system, since they are too widely dispersed to have meetings. Some of the national user groups are run on a commercial basis, with one or two people treating it as a full time occupation; others are run by a much larger number of amateurs, using what time they can find.

Another type of club is the "closed" computer club. This is the kind of club that is usually started at the place of work or a school, and caters exclusively for employees or pupils. Some such clubs do have an open "affiliate" membership (particularly the clubs attached to colleges or universities), but others do not. Such clubs work well in large organisations where people have free time in the vicinity of the normal premises, and I have had reports of clubs being formed among the British troops in West Germany, and at various army bases. Other institutions which have brought forth computer clubs include banks and government departments.

But the main type of club I'm writing about is the local computer club. This kind of club has membership open to all those in the area who are interested in home computing or personal computers. Some local clubs are specific to a certain machine, but many others are of general scope, so allowing members to gain from the cross-fertilisation of ideas, and to see a variety of computer systems in action when considering a purchase. So what goes on at a local computer club?

Well, that rather depends on the type of club it is, but two activities are very common. They are speaker meetings or lectures, where an outside speaker or a member of the club gives a talk of perhaps an hour on a subject about computers; and "workshop sessions" where members mix informally and spend time in hands-on use of computers. Some of the large local clubs have machine-specific sub-groups for discussion of, say, Dragon-related topics, with general meetings to discuss perhaps artificial intelligence of robotics. And many local clubs will run communications workshops.

So what is the ACC's role in all this? The ACC is the national Association of Computer Clubs, which is the representative and liaison body for computer clubs across the country. It is controlled by the computer clubs which it represents, through a representative council of club delegates. It is a non-profit making organisation.

One of the areas in which the ACC is active is in putting people in touch with their local clubs. The ACC maintains a clubs' database and we can give people the details of their nearest clubs. But of course we can't do this if people don't tell us about their clubs, so if you run a club please write to tell us about it and we will make sure it gets on the database.

The ACC is also active in the communications field. We run an area on Prestel called Club Spot 800 (part of the Micronet 800 database). The ACC is also involved with the national user groups at computer shows and exhibitions.

There is a club affiliation scheme, which allows clubs to affiliate to the ACC for a nominal fee of £6 a year (to cover our administrative expenses). Affiliated clubs are able to send a representative to the ACC Council and can take part in Club Spot. We are also arranging an insurance scheme for affiliated clubs.

If you are running a local computer club, wanting to find a nearby computer club or thinking of starting your own computer club, then please write to me. The ACC has a Club Information Kit available free which gives advice on setting up and running computer clubs, as well as the database enquiry service. Please address any enquiry resulting from this article to me, Rupert Steele, 17 Lawrie Park Crescent, London SE26 6HH and I will pass it on to the correct officer. ■

Dragon clubnet

Berkshire: J R Griffin wants his small group to get bigger — write to 1 Garrard Road, Britwell Estate, Slough, Berkshire, or telephone Slough 35268.

Cornwall: 6089 User Group, c/o Paul Hills, 28 Woburn Road, Launceston, Cornwall — international postal group.

Derbyshire: Dragon Owners' Club, Dragon Dungeon, PO Box 4, Ashbourne, Derbyshire — publishes *Dragon's Teeth.*

Devon: Brixham Computer meets every Wednesday evening at the Golden Lion, New Road, Brixham — write to Ian Chipperfield, 22 Brookdale Court, Brixham, Devon, or telephone Brixham 59224.

Dorset: Dragon 32 Users' Club, Games and Computers, 31 North Street, Wareham, Dorset.

Essex: Doug Bourne, Dragon Independent Owners' Association, School House, Nevern Road, Rayleigh, Essex.

Hertfordshire: Paul Kennedy wants to form a users' group. His address is 61 Broadmeads, Amwell End, Ware, Hertfordshire. Telephone Ware 68264.

Lancashire: Melvin Franklin, North West TRS-80 Users' Group, 40 Cowlees, Westhoughton, Bolton, Lancashire — growing number of Dragon users, meets monthly at Irlam near Manchester and publishers newsletter.

London: 68 Micro Group, 41 Pebworth Road, Harrow, Middlesex — publishes *68 Microcosm* and meets monthly at central London locations, write to the group for further details — all 68XX owners welcome.

Nottinghamshire: Dragon User Group meets on Mondays at the Congregational Centre, Castle Gate, Nottingham — contact Mike Johnson, Rutland, 19 Gateford Close, Bramcote Moor, Beeston, Nottingham or telephone Nottingham 288541.

Staffordshire: Tony Beckedd, Tame Computer Club, 57 Adonis Close, Tamworth, Staffordshire — an all-user club including 15 Dragon owners, meets fortnightly.

Worcestershire: Droitwich Computer Club meets in the Walnut Room of Norbury House on the first and third Wednesdays of each month — contact A R Middleton at 14 Primsland Drive, Cherry Hill Estate, Droitwich, Worcester, or telephone Droitwich 775570.

Yorkshire: OS-9 User Group, 1st Floor, 16 New North Parade, Huddersfield — meets three times a week (Tuesday and Wednesday evenings plus Sunday mornings), telephone (0484) 516179 during the day or (0484) 864130 after 6 pm.

Yorkshire: Sheffield Dragon Users' Club meets monthly (alternating between a pub and Sheffield City Polytechnic) — contact Richard Crampton, 131 Herringthorpe Valley Road, Rotherham or telephone Rotherham 851545.

Channel Islands: Dragon User Group, c/o M J Buckle, Homestill, St Peter's Valley, St Lawrence, Jersey.

Scotland: David Anderson, Scottish Dragon Club, 1 Walker Street, Edinburgh.

Scotland: Stewart Hutchinson, 12A Firbank Terrace, Barrhead, Glasgow or telephone Glasgow 8805610.

Wales: Dragon Users' Club, Dragon Data, Kenfig Industrial Estate, Margam, Port Talbot, West Glamorgan — home of the Dragon and publishers of *Dragon World.*

France: Stachnick Hervé is looking for Dragon pen-pals to swap ideas and programs with. His address is 1 rue des Pivoines, 08000 Charlesville Mezieres, France.

New Zealand: E G Coker wants to start a Dragon and Colour Computer users' club — his address is 12 Collingwood Street, Whangarei, New Zealand.

South Africa: Ian McCall invites other SA Dragon owners to contact him at 35 Silwood Road, Rondebosch, Cape Town.


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Daunting software scenarios

*Follow **John Scriven** as he ventures into the software world to fight off thugs, steal a secret weapon, free the workers and much more . . .*

IN RECENT MONTHS I've seen quite a selection of so-called educational software that shouldn't have escaped from the grasp of the programmer. Perhaps in the distant past it might have been satisfactory to use computers to administer table tests or to demonstrate how to "do long multiplication". When a computer is used in the field of education, whether at school or at home, it needs to be used creatively, and needs to do things that could not be achieved in other ways. Although the programs that I've looked at this month are not advertised as being "educational", there are some that deserve a place in an educational collection far more than some that are sold as such.

One company that usually produces interesting programs is Shards Software. Following on from its earlier epic, Pettigrew's Diary, Shards has just released two adventures that follow a similar structure. Both consist of more than one program, and in Java Star, clues discovered in early sections are needed to achieve the final goal.

Mystery of the Java Star begins in Bristol, where you are shown a parchment that has been hidden in an old sea-chest for many years. Given £12,000 to begin with, you have to equip yourself for an expedition to find the fabled ruby, the Java Star of the title.

Your first expense is in assembling the jumbled message from the chest. The pieces are set out like those little plastic puzzles where you rearrange the titles, and in this version you can swop pieces until the message is readable. To help you solve the problem, you are allowed to peep at the finished mission, but naturally nothing's for nothing, so each peep costs you £10.

Once you have worked out the dying message from the parchment, it crumbles into dust, and you have to repeat the procedure with the treasure map. If you have seen Puzzler from Shards, then you will see that it has cleverly incorporated the graphics routines from the earlier program in Java Star.

The second sub-program takes place in London, where living expenses are £30 per day. There are more than 30 different places you can visit in order to extract the vital information necessary for your trip but unsuccessful locations will cost you a day's expenses. As each fresh place appears on the screen, pressing the space bar reveals details, and whether any information is forthcoming. You certainly learn about some of the more interesting places to visit in London, from Mansion House to the National Maritime Museum, and this increases the educational value of the program.

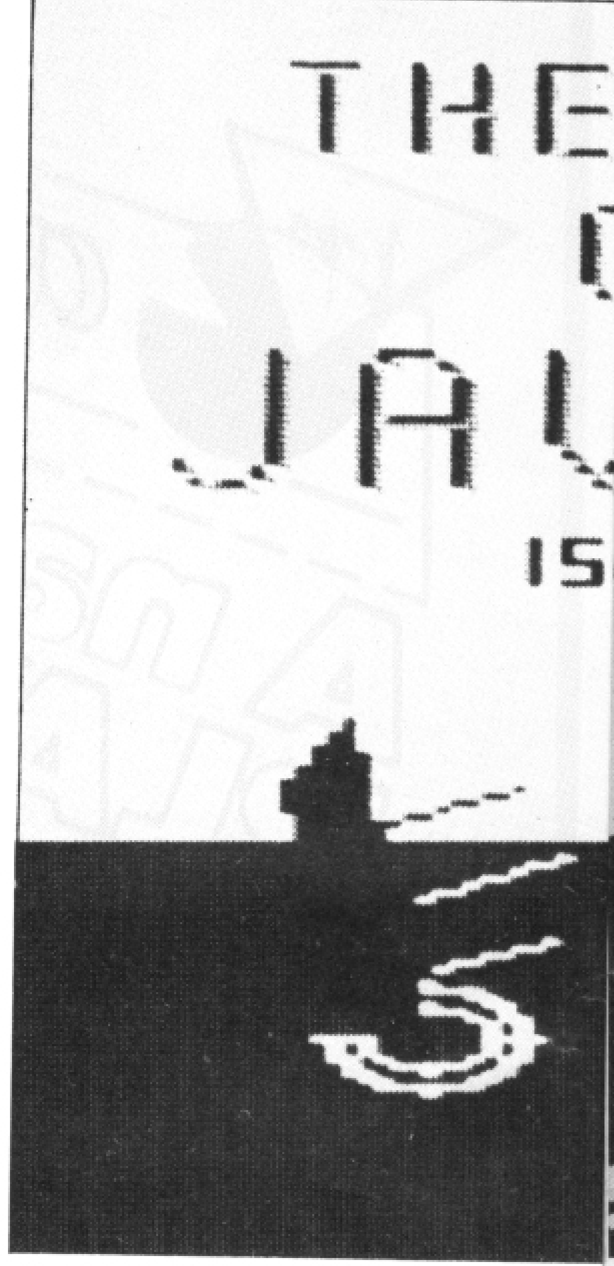
Deep-Sea diving

There are two more sections that allow you to explore an area of islands and to finally dive to find the true mystery behind this adventure. Although this doesn't tax the mind as much as most text adventures, it's fun to play and is the sort of software that should be used in schools, rather than the boring drills that seems to abound under the name of educational software. My one criticism is that once you reach the end, there's nothing left but to play an identical game. This, however, is a criticism of many adventure games, and it's not so easy that you'll reach the end in one evening.

North Sea Oil is a simulation program that puts you in the role of the Offshore Installation Manager of a North Sea drilling rig. This position entails getting a supply vessel to the rig and organising the workforce in the most economical way possible.

I didn't find this as interesting to play as Java Star, and I couldn't swear as to the accuracy of the simulation. But the program is well-written, and is a combination of a graphic adventure with a rule-the-economy kingdom-type game, and would be popular with older children who want something more subtle than mere alien-blasting.

Knowing that I'd already played all three editions of Dan Diamond's exploits, this month was looking a little flat. Luckily Salamander Software has produced another pair of strange adventures to entertain those of you who have a weird sense of humour.



Mystery of the Java Star: deciphering an ancient par

The Cricklewood Incident concerns the exploits of a certain Arnold Q Volestrangler, bored millionaire eccentric whose one aim in life is to seek the Holy Grail before retiring to the privacy of his padded cell. The screen display is used in a similar, though rather more complex way to that employed in the Dan Diamond trilogy, and is split into five sections: a scene description, a list of possible exits, a health indicator, an area for descriptions of objects and a section for messages and inputs. At the start you can choose a suitable persona, so ignoring the oppor-

Under review

Shards Software 189 Eton Road Ilford Essex	**Mystery of the Java Star** £7.95 **North Sea Oil** £5.75
Salamander Software 17 Norfolk Road Brighton	**The Cricklewood Incident** £7.95 **Wings of War** £7.95 **Turtle Graphics** £9.95
Abacus Software 21 Union Street	**Stargate** **Willy's Revenge**



parchment is the first daunting task as you journey in search of the fabled ruby.

tunity to be Ghengis Khan or Geoff Boycott, I adopted the role of Utter Wally (no comments, please!) and dived into the padded cell. After walking down a tree-lined road for some minutes, I met a Hell's Angel who challenged me to a fight. Choosing from a menu of unpleasant things I waved my armpits at him and he ran off, leaving behind 16 pence. As I stood there counting my ill-gotten gains, another Angel came up and mugged me.

Shortly after this I was abducted by an alien spacecraft and jettisoned in a chemist's. Soon after that, I pressed a button that I'd been warned not to touch and managed to lose the program. If you think you can cope with such lunacy coupled with a very high frustration level, then you may enjoy this program. I certainly found it amusing, but was also tempted on numerous occasions to melt the cassette down into something more useful, like a paper weight.

Wings of War is also a text only adventure using a formatted display, but this time the theme is more serious, and is set in occupied France during the last war. I say more serious, because nothing that comes from Brighton is ever completely what it seems, and there is a lot of tongue-in-cheek humour present here.

In a starring role as Lieutenant Roger Wilcoe, it is your mission to be parachuted down near a chateau where a new German secret weapon is being developed. Having found your possessions which are scattered through the dank wood, you can enter the chateau and attempt to collect the necessary bits and pieces which make up the bomb. If you reach this stage you can make your way to safety back in England.

If you prefer something slightly saner than The Cricklewood Incident, then you will probably enjoy pitting your wits against the Nazi menace in Wings of War. If you play these two adventures, it's a good idea to regularly save your position, as destruction awaits you round every corner.

Also from Salamander this month comes one of those monster video boxes containing a tiny cassette. In this case it can be justified to a small degree by the instruction booklet which is almost A5 in size. The program in question is **Turtle Graphics,** the first implementation I have seen for the Dragon.

Based on the graphics routines from the language Logo, turtle programs can demonstrate basic programming procedures far better than a language such as Basic. If you want to know the story behind Logo, you can do no better than to get a copy of Seymour Pappert's book *Mindstorms,* which describes the experience of children learning to program using Logo in the States. I am glad to see that Salamander has resisted the temptation to call this program Logo, like some firms who produce turtle graphics programs for other micros. A full implementation of Logo is far more than just turtle graphics, although this is an important facet of the language.

On the move

The idea behind Turtle Graphics is that you control a screen turtle, and give it commands which it obeys, such as forward, or right. As it moves, it leaves a mark to show its trail. Because of this, and its innate slowness, Snail Graphics would probably be a more accurate name. In fact, this version is not too slow, especially if your Dragon can operate faster by using the infamous high speed POKE.

Not only can the turtle move in immediate mode, it can also learn to obey a series of instructions entered as a little program. In this respect, it resembles the toy, Bigtrak. Each mini-program can have a name, so you can define a word, SQUARE, that consists of the commands F20, R90, F20, R90, F20, R90, F20, R90. (F stands for forward, and R for turn right so many degrees.) To make it simpler, you can put the commands in a repeat loop: ★4(F20 R90). If the word SQUARE was saved in the internal library, then entering @SQUARE would produce a little square in the middle of the screen. The word SQUARE can now be used in other definitions.

In *Mindstorms,* Pappert uses the example of a square and a triangle being defined, and the two being combined to make a word called HOUSE. This figure is repeated across the screen in the word STREET, showing that definitions can be built up and stored. The program Turtle Graphics also allows the use of variables and random numbers, and both the screen mode and colours can be changed during the course of the program and a permanent record saved if you have a printer or plotter attached. The accompanying booklet is well-produced, and contains both an instruction section and a reference section illustrated with little cartoons.

The Dragon is an ideal computer to use for this sort of program, as separate screens can exist in memory, and viewing the command or library area doesn't ►

Ramsbottom Bury Lancs	**Fireball** £7.95 each
Cable Software 52 Limbury Road Luton Beds	**Living Stone** £8.75
Dragon Data Kenfig Industrial Estate Margam Port Talbot	**Lunar Rover Patrol** £10.95 **Bloc Head** £7.95
Wellbrooksoft The Slade Peterchurch Herefordshire	**Witchway** £6.40

◀ end the drawing screen. As a drawing aid, this program falls short of specialist graphics utilities, but this is not where its main value lies. Apart from learning about simple programming, elementary geometry is used in a real environment that results in an interesting and very worthwhile cassette.

Arcade action

After the mind-taxing of adventure programs, and the fun of training turtles, I thought I'd relax one evening and check out the latest arcade games. It was not as pleasant as I'd anticipated, however. The first cassette I picked up was **Stargate** from Abacus Software. When the Dragon first appeared in the dim and distant days of 1982, I used to curse the cassette operating system that produced so many duff loads. Only the early BBC micros and Orics seemed worse, and I ended up buying a vari-speed cassette deck with separate tone controls. Since then, I've rarely found a tape that failed to load on some setting, and indeed most tapes now load first time. After struggling with Stargate for 20 minutes, it finally loaded at full volume and tone, and an increase of 10 per cent in tape speed. Unfortunately, it wasn't worth the effort. The screen display is minimal — just a square in the centre designated the stargate, and an enemy ship that appears at random firing at one of the sides. If you fire back, your shots prevent the other ship from hitting you. There is no other display, and the game continues until you give up out of sheer boredom. There seemed to be a fault in the review copy, in that there was no on-screen scoring, so it was impossible to see how well I was doing. The instructions on the cassette sleeve were also different to those on the cassette itself.

After this experience, I faced **Willy's Revenge,** also from Abacus, with some trepidation. In fact, it's about a hundred times better than Stargate. Similar to the arcade game of Caterpillar, it involves chasing round a garden squashing any creatures that appear in your path. As you go over more things, the speed increases, as does your length, and the game gets more difficult. You lose a life each time you double back on yourself or run into the garden wall. I think I prefer the versions which pit you against the caterpillar rather than this one, but although not outstanding, it's a vast improvement on Stargate.

My favourite Abacus game this month is **Fireball.** The object is to climb to the top level of a burning building by means of several ladders and to hit a fire hydrant on the top floor with a hammer. On the way, you have to pass flames that threaten to engulf you, and once the fire is out, you can hitch a ride on a helicopter. This is an excellent game that is let down by the poor documentation on the cassette sleeve. Although it explains the idea behind the game, several of the features take some working out. It's possible to knock out the flames with your pick-axe or hammer, but this isn't even mentioned in the notes. If you can cope with this small difficulty, then the game can be recommended.



North Sea Oil: navigating a supply vessel to the rig

I was under the impression that Livingstone was a famous Victorian missionary and explorer. Apparently **Living Stone** is also "the most challenging game yet written for any home computer". Seeing something like this inscribed on the back of any cassette is likely to elicit the response "Oh yes?" from me, particularly in my more cynical moments. This game from Cable Software does have its moments, however, and while I would disagree with their description, I do find it an interesting and original game.

The screen shows a complex arrangement of seven overlapping 12-sided figures. These in turn contain a total of 30 squares, 24 triangles and seven hexagons. Taking it in turns, the object is for two players to place 15 stones on the vertices (corners) of the polygons. This is achieved by positioning cross-wires over the required position and pressing the fire button on the joystick. If you place your pieces on the corners of a square, you are allowed to move two of your opponent's pieces; if you complete a triangle, you can move just one. The object of the game is to complete any of the hexagons. If this isn't achieved in the first stage (while you still have fresh stones to place on the board), then you are allowed to slide existing stones from one position to the next, until someone succeeds in completing a hexagon.

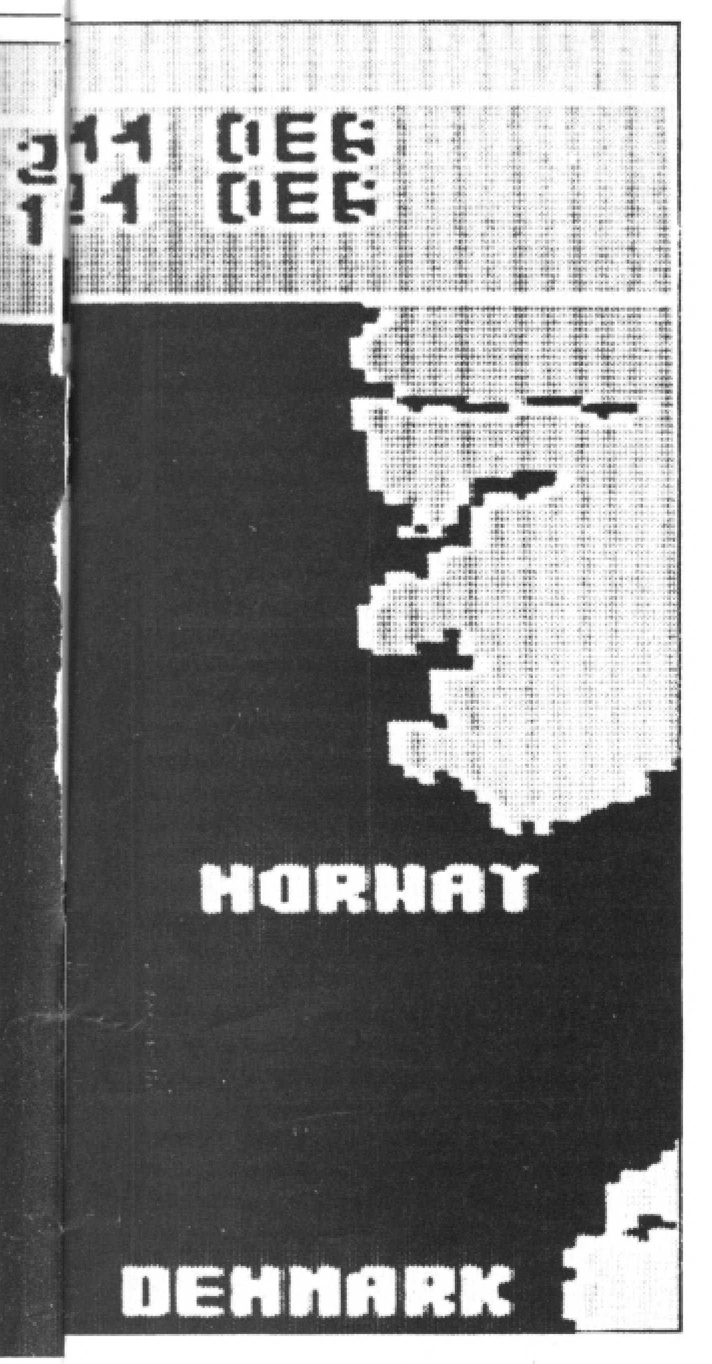
You can play against another human, or against the computer, and if you enjoy board games, this is certainly one to add to your collection.

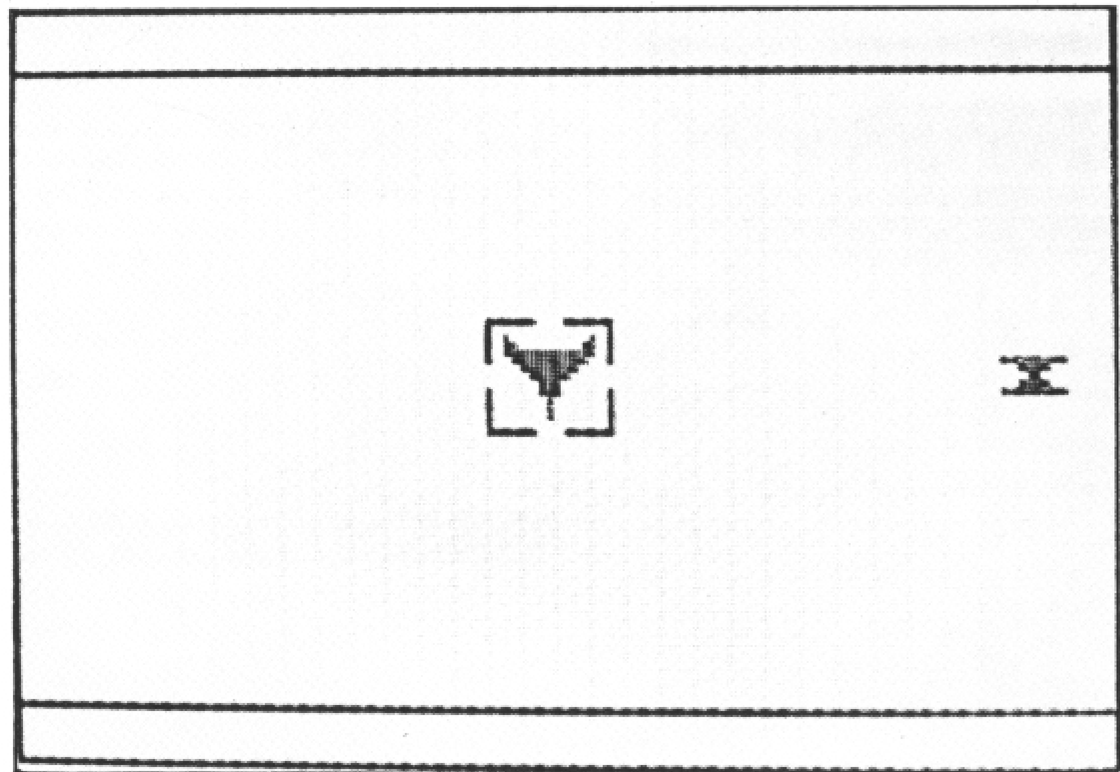
Mooning

Dragon Data has been lying low for a couple of months, but it has recently come up with some rather good software. This month I've been looking at some arcade games that originate in the States, as do most of Microdeal's programs.

Lunar Rover Patrol gives you the opportunity to drive a moon buggy over a sideways-scrolling and gently undulating terrain. Obstacles litter your path, and some of them need to be jumped over, while others can be blasted out of the way with a laser cannon. There are five stages with different obstacles and different backgrounds. Although the program is called Lunar Rover, and has an earth hanging in the sky, the scenery is rather too nice for the moon, and comes complete with lunar Barrett homes in little estates.

If you drive into a crater, the buggy disappears, and a pair of wheels roll alarmingly away from a small explosion. At this point, you carry on in a fresh vehicle from the stage you reached, which makes



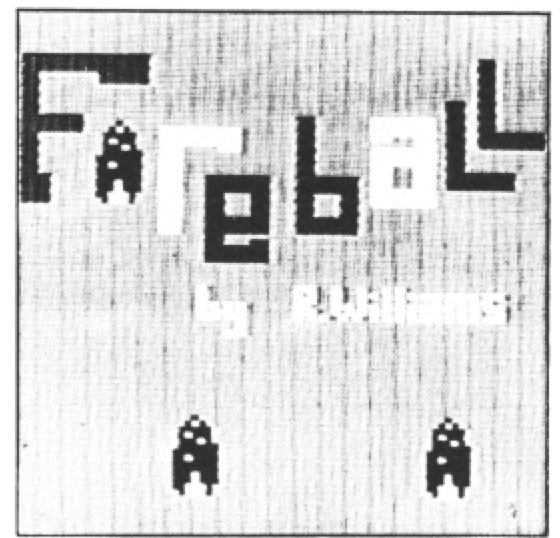

Wings of War: a text only adventure in search of a deadly secret weapon

Stargate: minimal screen display from Abacus Software

a pleasant change from all those games that send you back to the beginning each time you crash. The stage in the course you're at is shown at the top of the screen, as is your score and the number of buggies remaining. Apart from the oversized packaging and the price (£10.95), this is an entertaining arcade game, and should appeal to a wide audience.

Bloc Head, also from Dragon Data, is nothing to do with Ian Drury and his rhythm stick, but is instead a game played on a grid of diamonds. Because of the way in which they are coloured, they look like a pile of building blocks in 3-D. Controlling a small figure with the joystick, the aim is to jump on to as many of the blocks as possible, while avoiding other creatures who spring happily around the playing area. As you land on a block, its colour turns from yellow to blue, and if you land on all of them, the screen changes colour, and the game hots up. Although not really original (I seem to remember seeing something like it on an arcade machine last year), it's a novel game for the Dragon, and again, my criticisms are not levelled at the program, but at the high price and the superfluous packaging.

Both these Dragon Data games have large explanatory booklets, but these only contain about 300 words each, which


Put out a burning building in Fireball

would fit inside the back of a standard cassette case. I would have thought the size of case used by companies like Salamander and Premier, about three and a half by five inches, was large enough to contain ample documentation while still being small enough to fit comfortably in a rack.

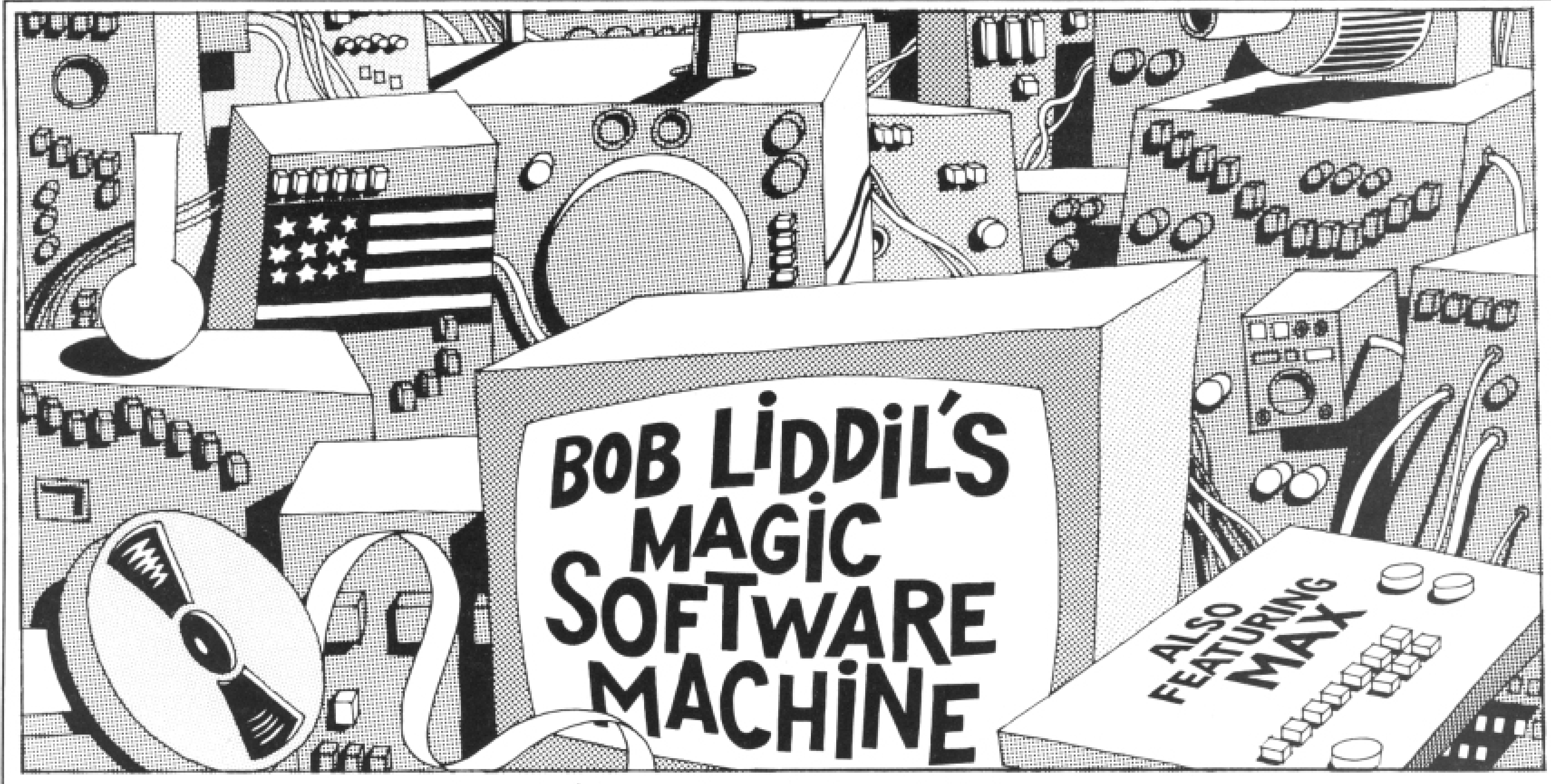
Marxism?

The last cassette I've looked at is **Witchway** from Wellbrooksoft, a new name to Dragon owners. This is a graphic adventure game that involves making your way round a high resolution maze. The object of the game is to "free the workers in the mines from their chains", a noble socialist aim if ever I heard one. Preventing you from succeeding in this task is the witch Hexate (perhaps calling her Maggie was too near the mark for the author!).

After loading, you have to wait for some time for the maze to be generated, and this is necessary each time you get squashed by the walls, which is frequent and therefore most irritating, as is the fact that you have to sit through the "story so far" screens that are shown at the start. The maze generation itself is fine, as is the idea of trying to find hidden gates in the walls. If you are prepared to stick at it, you will eventually find your way to the middle and the Hex House, although the trip is anything but easy. I found I was getting killed with no warning as I made my way through the maze, which would be fine if you could restart the game immediately, but is frustrating when you realise that you have to wait for longer than a minute each time you want to play again. In spite of these minor irritations, the game should keep you entertained for many hours, and there are certainly some strange surprises waiting for you as you get closer to the game's centre.

In the main, I've been pleasantly surprised this month with the quality of the software. Even those tapes that get the "Lemon of the Month" award show more promise than the average attempt a year ago. If the standard keeps rising, everyone should benefit.

Next month I've been promised an exciting collection of new titles, which should be worth waiting for. I've just had a sneak preview of Junior's Revenge which looks very promising, King Kong's son getting his own back on wicked Luigi, and so on, so I'm just off to buy a bunch of bananas in case I need a bribe to get started next month! ■



WHEN YOUR best friend is a sentient computer program capable of downloading you into the actual world of Pacman or Donkey Kong you sleep very lightly. He has the entire house wired for speech input and output so that he may communicate with me if needs be. This situation is tolerable during worktime or even tea. But Max likes to wake me up early in the morning with urgings of hurry up. Even that is acceptable. I do tend to lounge about. But this morning I woke up on a strange planet and things like that haywire my day.

I do not immediately recognise this place. There are so many space-orientated programs in the Dragon/Tandy Colour Computer portfolio that one tends to lose track. Let's see, it can't be the Domes of Kilgari adventure. There are no domes. It can't be Star Trek. No Kirk or Spock. Wait a moment . . . I have it! This must be Adventure International's new Tandy colour version of the classic adventure Strange Odyssey. Max, what have you done?

Strange Odyssey, of all the original Scott Adams Adventure Series, had the cleanest plotline, the most logical solutions, and the most innovative storyflow. The premise was simple. Learn to operate the alien machine, take what you need from the places you are transported to and survive the ordeal. Originally written for the Tandy Model 1, Odyssey has been translated to a number of machines, most notably, the Tandy Colour Computer.

Except for the addition of graphics in the Atari version, no new ground has been broken in the CoCo version of Strange Odyssey. It is tightly wrapped as adventures go, careful of its pedigree and therefore faithful to the original. It was and is a pleasure to play. None of the brain-busting aspects of other adventures here. Just good old-fashioned clues and treasures, space style.

Compatibility with the Dragon is a matter for the UK producer to deal with and something not confirmed at this time. But the Adventure International organisation in Florida has never laid off on the job so I expect there'll be a Dragon version forthcoming.

I know how to play this game, I think to myself, taking note of the memory that things get cold on this planetoid when the sun goes down. I work my way over to the cave which contains the alien transport machine. I figure to go someplace warm until Max discovers what he's done.

But I reckoned without the phenomena of sideslip, which transports a program traveller from one world to the next. I knew the instant I materialised that I was not in the peaceful jungle dimension of Strange Odyssey.

Dastardly deeds

In fact, I rezzed in just in time to be very nearly fried by frantic laser fire from a hovering saucer. This guy was raking the entire area, shooting at everything that moved. I dove into a nearby crater and stopped moving. But I could see what was going on.

What I was seeing chilled me to the bone. I'd sideslipped into one of the most dangerous programs on the American market, Outhouse (translation: outdoor water closet with no water). I froze where I lay as the Dastardly Little Toilet Paper Snatchers dodged white hot laser bolts in their quest to accumulate yet more paper. Oh yes, I know this game well.

Outhouse from Computer Shack (soon to change its name due to pressure from Tandy who do not like the word "Shack" to appear on anything in the USA) is an improbable program that grows on you, after a while. The player assumes the role of Outhouse Protector General and takes the high ground with a gunnery position in the Flying Saucer. He has front, rear, upward and downward laser control which allows him to command the destruction of unauthorised flying things. His primary mission, though, is Guardian of the Watercloset.

It seems that there is a paper shortage. And the DLTPSs are everywhere, just waiting for a chance to steal in and make off with the precious paper. The action in this twitch (arcade game) is furious. There are laser bolts flying every which way as the Papersnatcher Third Air Engagement Squadron tries to blast the player's saucer from the sky. But ever faithful to his duty the Outhouse Protector General carries on.

Alas, in the heat of battle a stray laser bolt hits the Outhouse, which in turn vaporises indignantly at having been scrooched (laserblasted). The OPG loses points, then a new round begins.

At about this point the reader must think I'm having him on. But no! It's absolutely true! This game sells in the mid $20 range in the USA and will make its British debut as soon as someone with unmeasurable courage arranges to bring it across the water.

Is Outhouse Dragon compatible? I hit another stone wall. I'm beginning to think that outside of Tom Mix and a few others, the American producers may be unaware of the Dragon market, an injustice you could remedy quite easily by flooding them with British postcards.

I've been laying here for a quarter of an hour watching this battle for control of the water closet. I'm quite frankly petrified at the thought of exploring the rest of a world where toilet paper is the main form of currency.

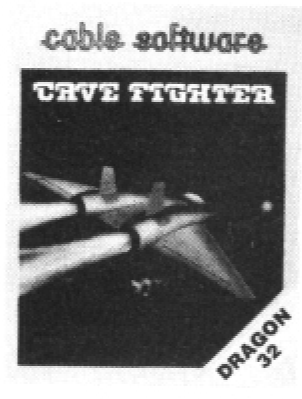
Then I feel the upload beam hit me. The scene before me derezzed and fuzzed out. Then the laboratory came into focus. I found myself listening to Max explaining all the reasons why the Dimensional Download System had malfunctioned.

I listened patiently. After all, with a friend like Max, one expects these little goof-ups from time to time. If I only knew which one of these little boxes contained the DDS ROM chip. On the other hand, from the inside out is not such a bad way to see these programs anyway, is it? ■

cable software for the DRAGON 32



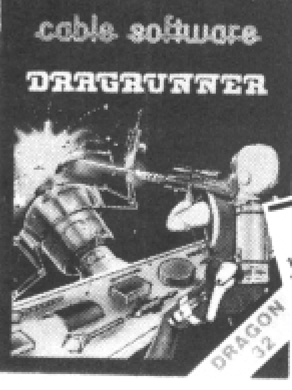
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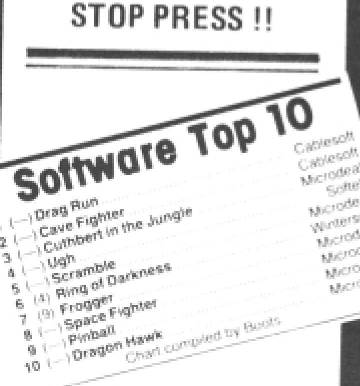


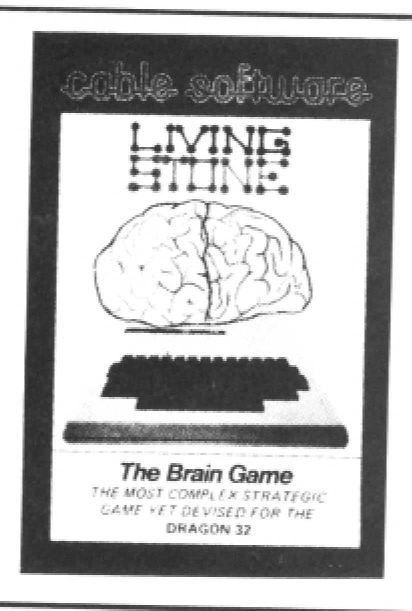
Chart reproduced from DRAGON USER March 1984.

Living Stone

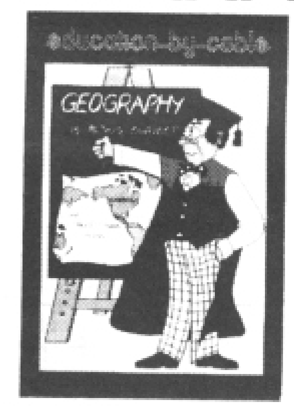
A GREAT BRITISH FIRST

The first version of this complex strategic game available on any home micro.

Compete against the Dragon and you will need all your powers of concentration to beat the computer, which is programmed to think for itself. Compete against mere mortals in the two player version on side two.

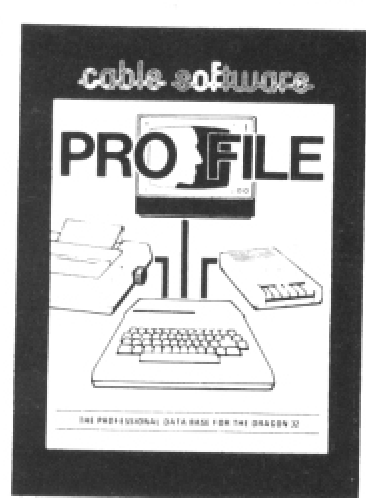


GEOGRAPHY



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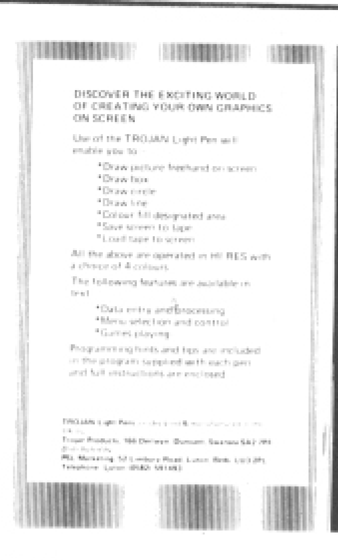


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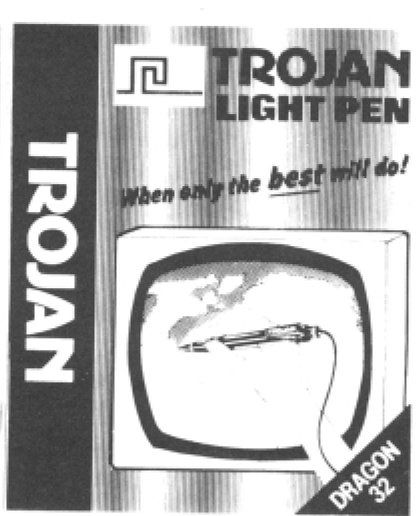
*Draw picture freehand on screen
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*Draw line
*Colour fill designated area
*Save screen to tape
*Load tape to screen

All the above are operated in HI RES with a choice of 4 colours

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A serious system

***Keith and Stephen Brain** review the Dragon's business applications and associated software*

ALTHOUGH THE Dragon 32 started life in the traditional games-oriented home micro mould, Dragon Data/GEC McMichael has started to push upwards into the small business market with the Dragon 64 and its range of "professional" software. At the same time many users have tired of just zapping aliens and mastering mazes and have started to look for more productive ways of employing their computer.

The OS-9 operating system (together with Basic09 and the Stylograph word-processing package) was reviewed in last month's *Dragon User,* but in case you missed that issue we should perhaps point out that Dragon Data's very powerful products will only run on a Dragon 64 with DragonDos and OS-9. However, for those with less dynamic Dragon systems, or less exotic tastes, a number of independent suppliers are also offering products which will run on the standard 32 or 64. Most of these are available on cassette, a large number can be obtained on DragonDos or Delta disks, and one is available in cartridge form.

Unspecialised

Some of the software is rather specialised, and is clearly aimed only at the business user, but much of it is of value to the average home user. In this article we will be looking at a number of the relatively unspecialised offerings (from both Dragon Data and the independents) which are of potential interest to the majority of users.

A number of programs are designed to help you balance your home budget. **Home Finance** (Abacus) is a relatively simple cassette program which allows you to keep records of income and expenditure under 11 headings. This number seems rather small and as they are only identified by the letters A to K you also need a good memory, which is rather self-defeating. We have reservations about whether simple record-keepers of this type are really better than pencil and paper.

Home Accounts (MST) was originally written for cassette but has also been modified for disk use. This gives you the option of making forward estimates of your budget, and will report on how closely you have kept to these. In addition it provides a bank account option within the same program. **Personal Bank Account** (Abacus) creates two types of data file. The current file stores up to 100 recent transactions (including standing orders), whilst the record file contains all previous transactions. Labels up to 10 characters long may be used to describe entries. Standing orders (24) and cross-checking of bank statements are also catered for. The entries can be sorted and transactions can be searched for by description and/or value.

Personal Banking System and **Bank Reconciliation Module** (Hilton) are a somewhat similar tandem pair of programs on two cassettes or one disk. The first program deals with cheque and standing order entries, allows you to search for items by date, amount, cheque number or description, will calculate totals by category and includes correction routines which allow you to amend figures retrospectively. The second program allows reconciliation between your bank statement and your personally computed account, and reports items outstanding. The comprehensive manual includes a description of the program and a nice touch is that Hilton promise comprehensive after-sales support.

The disk system has an interesting title page, although we trust that the gentleman shown is supposed to be "before" and not "after" using the system! (We understand that this program is currently being modified to run in conjunction with the Microdeal Rainbow Writer Screen Enhancer, so that a 51*24 column screen is used.)

Databases are filing systems which can have all sorts of practical uses, ranging from storing records of your stamp collection or favourite recipes to storing literature references or stock records, and a good non-specific database program can be tailored to the needs of your particular application. Care must be taken to read the small print when comparing claims for different databases as the amount of memory available is more or less fixed, and this can only be divided up into individual parts which add up to the whole capacity.

Files and fields

A "file" is made up of "records" which are divided into individual "fields". Thus if only 10000 bytes are available for storage then these can be used as 100 records with 10 fields each containing 10 characters, or 10 records with 10 fields containing 100 characters, but never as 100 records with 11 fields containing 10 characters, as this exceeds the total memory. With a disk system it is possible to have much larger data files, but only if the program is written to exploit this fact, and many simple conversions of cassette programs do not take full advantage. Common features are the ability to add, change, delete, find, sort, save and print records, but the various programs differ in detail.

The Filing System (Progressive) is particularly well designed for the novice user. It is cassette based and progressive provides an excellent manual together with a tutorial on tape which uses both an example data file and a real speech track to introduce the system. Other companies would be well advised to offer such a comprehensive package. Two different database programs are provided in the package. The first is free format, so that, for example, it is not necessary to decide in advance the maximum size of records. This makes it very easy to use, but slows down sorting and searching.

The second version is fixed format so that it is faster, it allows maths functions to be used for calculations within and through records, and provision is made for conversion of records from version 1 to version 2 format if you change your mind. Progressive is confident enough to offer a ▶

PERSONAL
BANKING
SYSTEM
HILTON COMPUTER SERVICES LTD.

A/C: ST GEORGE 1983 P. 2

DATE	DETAILS	DR/CR	BALANCE
3SEP	ORIC	-6.80	843.50
5SEP	SALES	98.00	941.50
17SEP	SINCLAIR	-19.62	921.88
26SEP	DRAGON	-10.00	911.88
31SEP	980550	-80.00	831.88
17OCT	SINCLAIR	-19.62	812.26
26OCT	DRAGON	-10.00	802.26
10NOV	980551	-12.26	790.00
16NOV	980552	-286.00	504.00
17NOV	SINCLAIR	-19.62	484.38

Figure 1: sample printout of Hilton's Banking System

◀ customer "Hot-Line" for problems.

Game-king Microdeal has ventured on to the serious side again with the **Filmastr** data management system originated by Sum-Ware (cassette or disk). This program has a number of unusual features. First of all there is a full-screen editor, which allows you to easily design a customised data input screen with up to 20 fields. Once this format has been completed, it can be saved, and then the program neatly and automatically deletes the screen editor routines to maximise the space available for data storage.

Machine code subroutines are used to provide fast sorting (although unfortunately on our version these seemed to clash with the ROM on the 64!) and relational operators are allowed in sort selection. As we have come to expect from a US conversion, what it does it does very well (and at least they have had the sense not to associate the name of Cuthbert with this one!).

Infomanager (J-Soft) is rather a hybrid as it includes a database, a calculator, and a barchart plotter. Rather than using the traditional menu approach, where you enter numbers or letters to select screen options, this program uses "command" words. You may obviously have a personal preference for one system or the other but we must agree with the comment in the excellent manual that menu selection often becomes irksome once you have learnt how to use a program. A "HELP" screen can be called up at any time if you cannot remember a particular command word, "STATUS" will give you a useful indication of the amount of memory already used, and "PRINT" contains options which allow you to easily include formatting commands. Records may be transferred to any of 12 individual system memories, where they may then be subjected to calculation, and plotted out as a barchart. This program is inexpensive and provides a reasonable introduction to data management for the home user.

Limited system

MST offers **Database** on cassette and disk. This has the standard basic options, but the record sizes are limited, and the ease of use and capabilities of this program seem to fall rather short of the other systems described so far, and it has little to recommend it. A version supporting the Compusense hi-res cartridge is available, but of course this cannot be used with a disk system.

The final program considered in this section is the Dragon Data **RMS** (Record Management System) which runs under OS-9. This weighs in at a hefty £54.95 but is really in a different class to the other systems, as it was originally written to run on much more expensive 6809 machines. Of major importance is the extreme flexibility of the system, and the ability to transfer files readily between RMS and other OS-9 programs, such as Stylograph, Dynacalc (see below) and Basic09.

We have criticised Dragon Data's new standard packaging for its simpler offerings, but we must admit that for these serious products it fits the bill well, as the case contains the disk and detailed manual, and the rear cover clearly indicates with icons and words the system requirements. A 51*24 column screen display is used, so that it is possible to show much more information on screen. The disk contains a suite of machine code utility modules. RMSNEW is used to create and format a new RMS data file tailored to your exact specifications (which can be altered later). RMS is an editor which is used to input and modify date in files. REPORT is used to produce output of selected fields to any standard output path (screen, printer or disk file) in a totally controllable way. INDEX adds great power as it allows you to produce any number of indexes to the contents of your random access database, which can then be used to drive the editor and report programs.

Home Finance £8.00 (C) **Personal Bank Account** £7.95 (C) **Spreadsheet** £9.95 (C)	Abacus Software 21 Union Street Ramsbottom Nr Bury Lancs
CD Series Home Accounts £19.95 (C) £24.95 (D) **CD Series Database** £19.95 (C) £24.95 (D) **CD Series MST-Calc** £19.95 (C) £24.95 (D)	MST Consultants Newton Road Bovey Tracey Devon TQ13 9BB
Personal Banking System £12.00 (C) £15.00 (D)	Hilton Computer Services 10 Jerome Road Larkfield Kent ME20 6UR
Infomanager £9.00 (C)	J-Soft 9 Tiverton Avenue Northampton NN2 8LY
Filmastr £19.95 (C)	Microdeal 41 Truro Road St Austell Cornwall PL25 5JE
The Filing System £20.00 (C)	Progressive Software Marsh Street Walsall West Midlands
Dynacalc £59.95 (0) **RMS** £54.95	Dragon Data Kenfig Industrial Estate Margam Port Talbot West Glamorgan SA13 2PE
Elite-Calc £45 (CT) £45 (D)	Microcare 1 Oakwood Road Heath Stoke-on-Trent

Finally RMSCOPY allows you to change file structure and merge separate files together. At first the system is rather bewildering as when setting up the first file it can be a little difficult to see the wood for the trees, but once you have passed this hurdle manipulating the database is simple and it is easy to create well mug-trapped structures, so that it is downhill all the way. A series of useful sample files are included on the disk for you to experiment with.

To use the REPORT facility you need to create a REPORT SPEC file, for which a text editor is necessary. The best way to do this is to use the Stylograph word-processor, but even the standard OS-9 system disk (which you need anyway) contains a simple text editor. This is a professional product of a very high standard and for any serious user it should soon pay its way.

Spreadsheets

A spreadsheet is made up from a matrix of individual "cells" which can normally contain text, values or formulae. The major use of speardsheets is in "what-if" projections where you can examine the "knock-on" effect of changes in any particular factor(s). **Spreadsheet** (Abacus) is a relatively simple, limited but inexpensive implementation which is more or less dedicated to cashflow projections. The instructions are rather sketchy and it seems of limited general value. **MST-Calc** (MST Consultants) is a disk-based program including a 15 page manual which explains quite clearly with examples the function and operation of the spreadsheet.

MST-Calc has a fixed format cell structure with 20 columns (each 13 characters long) and 21 rows. This gives a total of 420 cells, although only 39 of these can be on screen simultaneously. Mathematical operators can be used across columns and down rows. Cell contents can be formatted globally or individually as signed pounds and pence, signed integers, right justified, left justified, or as a bar chart plot. A row or column can be inserted or deleted, a window of the spreadsheet protected against alteration and calculation may be automatic or manual. Information can be stored on disk as one of five disk files, the disk directory can be inspected, and a hard copy of the spreadsheet produced with the print option.

Replicate is a useful feature which allows you to copy a particular formula into consecutive cells with automatic adjustment to the co-ordinates of other cells referenced. MST-Calc is more sophisticated than the offering from Abacus, but, as it is written in Basic, it is rather slow and the manual warns that "you must be patient when large numbers of calculations are being performed".

Elite-Calc is a very elegant full-feature US machine code spreadsheet program modified for the Dragon by Microcare, who is offering it on cartridge or disk. It provides a grid with 255 rows and 255 columns and the width of any particular column can be set individually to values between 1 and 29 to produce a customised structure. Individual cells, ranges of cells and whole blocks of the matrix can be referenced, and they can be blanked, copied, replicated or moved.

In edit cell mode a Basic type line editor is provided which allows you to easily modify the contents of a particular location, and new rows or columns can be inserted. Cells may contain numbers, text or formulae and in addition to the usual maths operators and trig functions a number of non-standard functions are provided (average, count, lookup, max, min and sum), and IF . . THEN . . ELSE is supported. Constant mode allows you to predefine ▶

```
L 1,1 ;
T ;
T "SAMPLE PRICE LIST IN ORDER BY PRODUCT DESCRIPTION"@8;
T ;
T "DESCRIPTION OF PRODUCT              PART NUMBER      RETAIL PRICE"@1
T "------------------------------------------------------------------"@1
P DESC@1 PARTNO@35 PRICE@52 ;
X DESCRIP;
```

Figure 2: sample printout listing of Dragon Data's Record Management System report file

◀ 25 constants which may be numbers, expressions or functions. No less than 15 different cell formats can be specified.

The default for numbers is decimal with two digits to the right and the integer portion to the left, but this can be altered to give: a fixed number of decimal places, integers only, comma insertion (eg 1,000,000.00), left justification, right justification, scientific notation, graphic display (barchart), automatic + and – display, and leading dollar sign. Text may be left or right justified and alternate printer fonts can be called. Ranges of data may be sorted into ascending or descending order, a text lock can be enabled, and "?" will produce a disk directory. Data is normally written to tape or disk as a machine code file, but, an ASCII dump is also possible, which is

data). These can be used to produce a scrolling display with static labels, or to store "sensitive" information, such as cost prices on a price list. Full control of format for printer output is provided. The pre-production cassette version we tested used the standard Dragon low-res screen but we understand that the final version will feature a high-res screen driver giving a 51 by 24 display which will further enhance the value of this very impressive program.

Dragon Data is offering the well-established OS-9 spreadsheet **Dynacalc** for £59.95. Once again this program has been thoroughly tested on more sophisticated systems and is most impressive. In many ways its capabilities are comparable to those of Elite-calc

to create "windows" where the screen (51*24) is split horizontally or vertically into equal or unequal sections which can be formatted separately and scrolled together or independently, and horizontal or vertical "titles" can be enabled. Degrees can be used as well as radians and "extra" functions are ACOS, ASIN, LOG (as well as LN), PI, ROUND, NPV (net present value), STDDEV, CHOOSE, INDEX and ERROR. Elite-calc scores on FIX, SGN, RND and IF-THEN-ELSE structures.

The range of capabilities (and of course prices) of the programs reviewed here is wider than usual so you must remember to carefully consider your present and future needs. If your actual or potential needs are extensive and you will benefit from a whole

Caterpillar capers

On the caterpillar trail – a game of survival by ***Peter Hooton***

THIS IS a caterpillar-type game in which you must eat the green leaves scattered around the screen. But as you move poisonous red toadstools begin to appear and lines try to capture you (even Kafka never had it so bad). When you have eaten all the leaves you start a new sheet. Clearing three sheets gives you a bonus before moving on to a harder stage of the game.

Program notes

Lines	
0-100	Print introduction page.
100-400	Set up variables and select difficulty.
450-530	Draw pits.
540-640	Place leaves.
650-1100	Control movement.
1110-1660	Place toadstools and draw lines.
1670-1770	Remove leaf and add five to score.
1780-1930	Clear screen, routine for falling down pit, set variables for next stage.
1940-2110	Blank out caterpillar before changing direction.
2120-2310	Death routine.
2320-2610	Check if score is in Top Five and print high score table.
2620-2820	Bonus routine.

Variables	
CH, BH	Contains character falling down pit and space which erases character.
HS, HS$	High scores and names of holders of high scores.
L, HL, VL	Lines and distances.
DL	Difficulty level — the amount by which B is decreased each stage.
SC	Score.
ST	Stage of game reached.
NS	Number of sheets cleared in present stage.
A	Number of leaves to eat in that stage.
P	Number of leaves already eaten in sheet.
B	Number of pixels to move before toadstools appear.
C	Direction of movement.
PI	Number of times fallen down pit.
J	Number of times game completed.

```
10 CLS:PRINT@8,"**SURVIVAL**";
20 PRINT@64," A CATERPILLAR-TYPE GAME IN"," WHICH YOU MUST EAT THE GREEN"," LEAV
ES SCATTERED AROUND THE"," SCREEN.BUT BEWARE!! AS YOU "," MOVE POISONOUS RED TOA
DSTOOLS"," BEGIN TO APPEAR AND LINES TRY "," TO CAPTURE YOU."
30 PRINT@288,"  WHEN YOU HAVE EATEN ALL THE"," LEAVES YOU START A NEW SHEET.","
CLEARING THREE SHEETS GIVES"," YOU A BONUS BEFORE MOVING TO"," A HARDER STAGE OF
 THE GAME."
40 PRINT@480,"PRESS (ENTER) TO BEGIN...";
50 I$=INKEY$
60 IF I$<>CHR$(13)THEN 50
100 REM SURVIVAL;P.HOOTON APRIL-JUNE 1983
110 PCLEAR 8:CLEAR 500
120 DIM CH(17),BH(17),HS(5),HS$(5),L(20)
130 FOR T=1 TO 5
140 HS(T)=5000
150 HS$(T)="SNOOPY"
160 NEXT T
170 SCREEN 0,0:CLS 5
180 CLS 0
190 W$="survival"
200 FOR U=1 TO 8
210 PRINT@12,LEFT$(W$,U);:SOUND40,1
220 NEXT U
230 PRINT@420,"USE CURSORS TO MOVE";
240 PRINT@66,"SELECT DIFFICULTY(1-5)";:INPUT DL
250 IF DL<1 OR DL>5 THEN 240
260 REM VARIABLES
270 SC=0:ST=1:NS=0:PI=0:HL=0:VL=0
280 A=10:B=60:C=RND(4):P=0:J=0
290 PRINT@98,"SELECT STAGE(1-15)";:INPUT ST
300 IF ST<1 OR ST>15 THEN 290
310 A=A+ST:B=B-DL*ST:IF B<5 THEN B=5
320 FOR U=1 TO 10:L(U)=RND(192):NEXT U
330 FOR U=11 TO 20:L(U)=RND(256):NEXT U
340 X1=RND(100)+8:X2=RND(100)+148
350 Y1=RND(68)+8:Y2=RND(68)+116
360 FOR T=1 TO 5
370 HL(T)=0:VL(T)=0
380 NEXT T
390 REM DRAW SCREEN
400 IF J=1 THEN ST=1:A=10:B=60:P=0
410 X=128:Y=96:I=128:O=96
420 PMODE 1,1:SCREEN 1,0:PCLS 2:COLOR 4,2
430 LINE(0,0)-(256,192),PSET,B
440 CIRCLE(X1,Y1),7,3
450 CIRCLE(X1,Y2),7,3
460 CIRCLE(X2,Y1),7,3
470 CIRCLE(X2,Y2),7,3
480 PAINT(X1,Y1),3,3
490 PAINT(X1,Y2),3,3
500 PAINT(X2,Y1),3,3
510 PAINT(X2,Y2),3,3
520 REM PLACE GREENS
530 FOR D=1 TO A
540 R=RND(252)+2:S=RND(188)+2
550 FOR T=-1 TO 1 STEP 2:FOR U=-1 TO 1 STEP 2
560 IF PPOINT(R+T,S+U)<>2 THEN 540
570 NEXT U,T
580 FOR T=-1 TO 1 STEP 2:FOR U=-1 TO 1 STEP 2
590 PSET(R+T,S+U,1)
600 NEXT U,T
610 PLAY"V20L255T25503B"
620 NEXT D
630 POKE 65494,0
640 REM MOVEMENT
650 FOR D= 1 TO B
660 IF P=A THEN P=0:GOTO 410
670 B$=INKEY$
680 IF B$="" THEN ON C GOTO 750,840,930,1020
690 GOSUB 1930
700 IF B$=CHR$(94)THEN C=1:GOTO 750
710 IF B$=CHR$(10)THEN C=2:GOTO 840
720 IF B$=CHR$(8) THEN C=3:GOTO 930
730 IF B$=CHR$(9) THEN C=4:GOTO 1020
740 ON C GOTO 750,840,930,1020
750 Y=Y-2
760 IF PPOINT(X,Y)=1 THEN GOSUB 1660
770 IF PPOINT(X,Y)=3 THEN SOUND 200,1:GOSUB 1780:GOTO 410
780 IF PPOINT(X,Y)=4 THEN 2110
790 PSET(X,Y,3)
800 I=X:O=Y+7:IF O>194 THEN O=194
810 PRESET(I,O)
820 NEXT D
830 GOTO 1100
840 Y=Y+2
850 IF PPOINT(X,Y)=1 THEN GOSUB 1660
860 IF PPOINT(X,Y)=3 THEN SOUND 200,1:GOSUB 1780:GOTO 410
870 IF PPOINT(X,Y)=4 THEN 2110
880 PSET(X,Y,3)
890 I=X:O=Y-7:IF O<2 THEN O=2
900 PRESET(I,O)
910 NEXT D
920 GOTO 1100
930 X=X-2
940 IF PPOINT(X,Y)=1 THEN GOSUB 1660
950 IF PPOINT(X,Y)=3 THEN SOUND 200,1: GOSUB 1780:GOTO 410
```

Continued on page 29



'Dataplus have made their name supplying computer peripherals at competitive prices. I believe that we have now found the best price/performance daisy wheel alternative to dot matrix. The ideal printer for both data and word processing. Truely, a high quality machine at an affordable price. As Managing Director, I guarantee you won't buy better.'

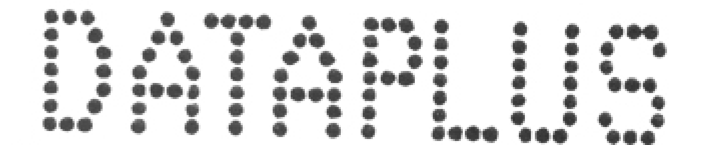
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*CBM 64 & Spectrum Computers require a special interface cable kit. For assistance & price phone our Technical Hotline.

R. Brotherhood

SPECIFICATIONS
Print Speed: 120 wpm
Character set 128 ASCII 88 printable
Character spacing: 12 CPI
Printing: Unidirectional
Paper width: 13" max.
Writing line: 10.5" 126 character line
Line spacing: 6 lines per inch
Paper Feed: Friction, single sheet or fanfold.
240 volts, 50Hz
Dimensions: (H) 6.4" (W) 19.5" (D) 12.4"
Weight: 18.5 lbs

Operator Controls: Power on/off, top of form, impression controls (5 levels)

INTERFACES
Parallel
Centronics compatible, 7 bit parallel data, 3 control lines (data, strobe, busy, acknowledge)
Serial
RS232C compatible, 50-19200 BPS, parity and character bit length all switch selectable.

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Qty	Description	Price	Total
	TP1(s) with RS232 interface	£250	
	TP1 with centronic interface	£250	
	Interface cables serial/parallel*	£15	
	Tractor Feed	£79	
*Delete as applicable		Total	

I enclose my cheque for £ ______ crossed and made payable to DATAPLUS-PSI Ltd or charge my Access/Barclaycard* Account No.

Expiry date of card

Signature ....

Name ....
Address ....
....
Postcode ....
Telephone No: ....
Make/Model of my computer ....
....

DU3

```
960 IF PPOINT(X,Y)=4 THEN 2110
970 PSET(X,Y,3)
980 I=X+7:O=Y:IF I>254 THEN I=254
990 PRESET(I,O)
1000 NEXT D
1010 GOTO 1100
1020 X=X+2
1030 IF PPOINT(X,Y)=1 THEN GOSUB 1660
1040 IF PPOINT(X,Y)=3 THEN SOUND 200,1:GOSUB 1780:GOTO 410
1050 IF PPOINT(X,Y)=4 THEN 2110
1060 PSET(X,Y,3)
1070 I=X-7:O=Y:IF I<2 THEN I=2
1080 PRESET(I,O)
1090 NEXT D
1100 REM OBSTACLES
1110 POKE 65495,0
1120 R=RND(252)+2:S=RND(188)+2
1130 FOR T=-1 TO 1 STEP2:FOR U=-1 TO 1 STEP 2
1140 IF PPOINT(R+T,S+U)<>2 THEN 1120
1150 NEXT U,T
1160 FOR T=-1 TO 1 STEP 2:FOR U=-1 TO 1 STEP 2
1170 PSET(R+T,S+U,4)
1180 NEXT U,T
1190 PLAY"O5G"
1200 REM LINES
1210 HL=HL+8
1220 IF HL>252 THEN HL=252
1230 LINE(0,L(1))-(HL,L(1)),PSET
1240 IF ST=1 THEN 630
1250 LINE(256,L(2))-(256-HL,L(2)),PSET
1260 IF ST=2 THEN 630
1270 LINE(0,L(3))-(HL,L(3)),PSET
1280 IF ST=3 THEN 630
1290 LINE(256,L(4))-(256-HL,L(4)),PSET
1300 IF ST=4 THEN 630
1310 LINE(0,L(5))-(HL,L(5)),PSET
1320 IF ST=5 THEN 630
1330 LINE(256,L(6))-(256-HL,L(6)),PSET
1340 IF ST=6 THEN 630
1350 LINE(0,L(7))-(HL,L(7)),PSET
1360 IF ST=7 THEN 630
1370 LINE(256,L(8))-(256-HL,L(8)),PSET
1380 IF ST=8 THEN 630
1390 LINE(0,L(9))-(HL,L(9)),PSET
1400 IF ST=9 THEN 630
1410 LINE(256,L(10))-(256-HL,L(10)),PSET
1420 IF ST=10 THEN 630
1430 VL=VL+6
1440 IF VL>192 THEN VL=192
1450 LINE(L(11),0)-(L(11),VL),PSET
1460 IF ST=11 THEN 630
1470 LINE(L(12),192)-(L(12),192-VL),PSET
1480 IF ST=12 THEN 630
1490 LINE(L(13),0)-(L(13),VL),PSET
1500 IF ST=13 THEN 630
1510 LINE(L(14),192)-(L(14),192-VL),PSET
1520 IF ST=14 THEN 630
1530 LINE(L(15),0)-(L(15),VL),PSET
1540 IF ST=15 THEN 630
1550 LINE(L(16),192)-(L(16),192-VL),PSET
1560 IF ST=16 THEN 630
1570 LINE(L(17),0)-(L(17),VL),PSET
1580 IF ST=17 THEN 630
1590 LINE(L(18),192)-(L(18),192-VL),PSET
1600 IF ST=18 THEN 630
1610 LINE(L(19),0)-(L(19),VL),PSET
1620 IF ST=19 THEN 630
1630 LINE(L(20),192)-(L(20),192-VL),PSET
1640 IF ST=20 THEN 630
1650 POKE 65495,0:J=J+1:GOTO 650
1660 REM EAT GREENS
1670 FOR T=-2 TO 2 STEP 2
1680 FOR U=-2 TO 2 STEP 2
1690 IF PPOINT(X+T,Y+U)=1 THEN PRESET(X+T,Y+U,2)
1700 NEXT U,T
1710 SCORE=SCORE+5
1720 SOUND 100,1
1730 P=P+1
1740 IF P=A THEN NS=NS+1:HL=0:VL=0
1750 IF NS=3 THEN 2600
1760 RETURN
1770 REM FALL DOWN PIT
1780 PMODE 4,5:SCREEN 1,1:PCLS5:COLOR 0,5
1790 LINE(152,0)-(96,192),PSET,BF
1800 DRAW"BM118,12;C5;S4;F6NE6U2R2U4L4D4R2D5NG6F6;C0"
1810 GET(116,10)-(136,30),CH
1820 GET(116,50)-(136,70),BH
1830 FORT=10 TO 172 STEP 21
1840 PUT(116,T)-(136,T+20),BH
1850 PUT(116,T+20)-(136,T+40),CH
1860 SOUND 200-T,1
1870 PUT(116,T+20)-(136,T+40),BH
1880 NEXT T
1890 ST=ST+1:A=A+1:B=B-DL:NS=0:P=0:PI=PI+1:IF B<5 THEN B=5
1900 IF PI=4 THEN 2260
1910 HL=0:VL=0
1920 RETURN
1930 REM CLEAR TAIL
1940 ON C GOTO 1950,1990,2030,2070
1950 FOR T=7 TO 1 STEP-1
1960 O=Y+T:I=X:IF O>194 THEN O=194
1970 IF PPOINT(1,O)=3 THEN PRESET(I,O)
1980 NEXT T:RETURN
1990 FOR T=7 TO 1 STEP -1
2000 O=Y-T:I=X:IF O<2 THEN O=2
2010 IF PPOINT(I,O)=3 THEN PRESET(I,O)
2020 NEXT T:RETURN
2030 FOR T=7 TO 1 STEP-1
2040 O=Y:I=X+T:IF I>254 THEN NEXT T
2050 IF PPOINT(I,O)=3 THEN PRESET(I,O)
2060 NEXT T:RETURN
2070 FOR T=7 TO 1 STEP -1
2080 O=Y:I=X-T:IF I<2 THEN NEXT T
2090 IF PPOINT(I,O)=3 THEN PRESET(I,O)
2100 NEXT T:RETURN
2110 REM DEATH
2120 COLOR 1,3
2130 FOR T=1 TO 5
2140 LINE(0,0)-(X,Y),PSET
2150 LINE(256,0)-(X,Y),PSET
2160 LINE(0,192)-(X,Y),PSET
2170 LINE(256,192)-(X,Y),PSET
2180 PLAY"T255L601DFEDFEDFE"
2190 LINE(X,Y)-(256,192),PRESET
2200 LINE(X,Y)-(0,192),PRESET
2210 LINE(X,Y)-(256,0),PRESET
2220 LINE(X,Y)-(0,0),PRESET
2230 PLAY"CDECDECDE"
2240 NEXT T
2250 GOTO 2320
2260 REM DIE ON FALL
2270 FOR T=1 TO 30 STEP 3
2280 CIRCLE(126,192),T,5
2290 PLAY"T255L401EE"
2300 NEXT T
2310 REM PRINT HIGH SCORE TABLE
2320 SCREEN 0,0:CLS
2330 FOR Q=1 TO 5
2340 IF SCORE>HS(Q) THEN 2370
2350 NEXT Q
2360 GOTO 2480
2370 FOR T=5 TO Q+1 STEP -1
2380 HS(T)=HS(T-1)
2390 HS$(T)=HS$(T-1)
2400 NEXT T
2410 HS(Q)=SCORE
2420 PRINT@66,"CONGRATULATIONS...."
2430 PRINT@130,"YOUR SCORE IS ONE OF THE TOP"
2440 PRINT@162,"FIVE SCORES RECORDED TODAY"
2450 PRINT@226,"PLEASE ENTER YOUR NAME":INPUT NA$
2460 IF LEN(NA$)>12 THEN 2450
2470 HS$(Q)=NA$
2480 CLS
2490 PRINT@65,HS$(1):PRINT@81,USING"££££££";HS(1)
2500 PRINT@129,HS$(2):PRINT@146,USING"£££££";HS(2)
2510 PRINT@193,HS$(3):PRINT@210,USING"£££££";HS(3)
2520 PRINT@257,HS$(4):PRINT@274,USING"£££££";HS(4)
2530 PRINT@321,HS$(5):PRINT@338,USING"£££££";HS(5)
2540 PRINT@7,"high scores"
2550 PRINT@452,"YOUR SCORE:";SCORE;
2560 Y$="T8O02L6EL7FL8GO1L4CDE":FOR U=1 TO 8:PLAY Y$+Y$:
     NEXT U
2570 POKE 65494,0
2580 FOR T=1 TO 500:NEXT T
2590 GOTO 180
2600 REM BONUS
2610 LINE(94,12)-(156,36),PSET,BF
2620 PAINT(94,12),4,2
2630 B$="U8R3FD2BNL3FD2GL3"
2640 O$="U8R4D8L4"
2650 N$="U8R2D8R2U8"
2660 U$="NU8R4U8"
2670 S$="R4U4L4U4R4"
2680 DRAW"C1;S8;"
2690 DRAW"BM98,32;S8;"+B$
2700 DRAW"BM110,32;S8;"+O$
2710 DRAW"BM122,32;S8;"+N$
2720 DRAW"BM134,32;S8;"+U$
2730 DRAW"BM146,32;S8;"+S$
2740 DRAW"C4"
2750 ST=ST+1:A=A+1:B=B-DL:NS=0:P=0:IF B<5 THEN B=5
2760 VL=0:HL=0
2770 SCORE=SCORE+500*ST
2780 PLAY"T6L3O2BL8AL3GL8FL3EL8DL1C"
2790 SCREEN 0,0:CLS
2800 PRINT@296,"BONUS=";ST*500
2810 FOR T=1 TO 1500:NEXT T
2820 REM PRINT SCORE
2830 D$=CHR$(131+112):T=INT(SCORE/50)
2840 IF T>450 THEN T=INT(SCORE/100):D$=CHR$(131)
2850 IF T>450 THEN T=INT(SCORE/400):D$=CHR$(131+80)
2860 IF T>450 THEN T=INT(SCORE/1600):D$=CHR$(131+64)
2870 IF T>450 THEN T=INT(SCORE/3200):D$=CHR$(131+48)
2880 IF T>450 THEN T=INT(SCORE/6400:D$=CHR$(131+32)
2890 CLS 0
2900 PRINT@14,"score";
2910 FOR U=0 TO T
2920 PRINT@32+U,D$;
2930 NEXT U
2940 PRINT@32+U,SCORE;
2950 IF D$=CHR$(131+112) THEN  SCREEN 0,1
2960 IF D$=CHR$(131+48) THEN SCREEN 0,1
2970 FOR T=1 TO 2000:NEXT T
2980 GOTO 390
```

Dragon finds a new lair

***Graham Cunningham** journeyed to Berkshire to meet Ron Bosanko of GEC McMichael, now marketing Dragon Data's products, and talks about future Dragon developments*

AN ELIZABETHAN estate in rural Berkshire is an unlikely place to find a satellite dish. However, there it sits, looking a trifle forlorn, beside the panelled walls that dominate the reception hall. But what's this got to do with the Dragon? Well, walk past the satellite dish and up the ceremonial stairs to the balcony. Open one of the heavy wooden doors and you'll find . . . peripherals for your Dragon, courtesy of GEC McMichael.

Sefton Park, the GEC subsidiary's home, has seen earls, barons and knights come and go — and now it's seen the Dragon arrive. GEC McMichael itself has as interesting a line of descent as the Park. The McMichael branch of the family came into existence in 1920, providing equipment for wireless experimenters. It expanded into producing television receivers, and then out again when it merged with GEC in 1961. The television end of the market was left in the hands of GEC (Radio and Television) while McMichael concentrated on defence electronics. Two years ago the two got together and became GEC McMichael. And earlier this year that company took over UK sales and marketing of the Dragon.

This gives GEC McMichael more than 60 years' experience in communications, including cable television and satellite broadcasting. "For example," the company said when it was formed, "McMichael is playing a major role in the Unisat programme to provide the UK's first privately funded satellite for the direct broadcasting of radio and television programmes."

And this puts the Dragon alongside a range of other interesting products. Radios, televisions, intelligent telephones, video recorders, viewdata, teletext and video-disc players — you name it in terms of home electronics and GEC McMichael's got it.

Dragon Data's enthusiasm for the marketing deal is hardly surprising. As managing director Brian Moore commented, it gives "the prospect of intergrating Dragon Data's range with the well established consumer electronic products marketed by GEC". The enthusiasm is mutual. Ron Bosanko, the GEC subsidiary's chairman, regards the micro's arrival as strengthening "our position in the fast growing home electronics marketplace". Moreover the deal leaves Dragon Data free to concentrate on "innovative product development".

Where next?

The possibilities for the Dragon within this range of supporting equipment are certainly promising. And Ron finds his enthusiasm hard to conceal, talking of the pivotal role micros can play between telephones at one end and the tv screen at the other. But he refuses to be drawn on this for the moment, promising only that ideas being discussed now should yield some interesting results by the end of the year — "moving things a little bit beyond the field of home computing".

On a more prosaic level, some of the results are already coming in. First of all there's the aforementioned peripherals: two printers and a cassette deck (or if you prefer, data recorder), designed in colours to match the 64 but equally compatible with the 32. These will be going out under the GEC McMichael name as they are also compatible with other micros. Target prices are about £30 for the cassette deck and £130 for each printer (one's a four-colour printer/plotter, the other's a thermal model). And you should be able to buy them in the shops this summer — if not earlier.

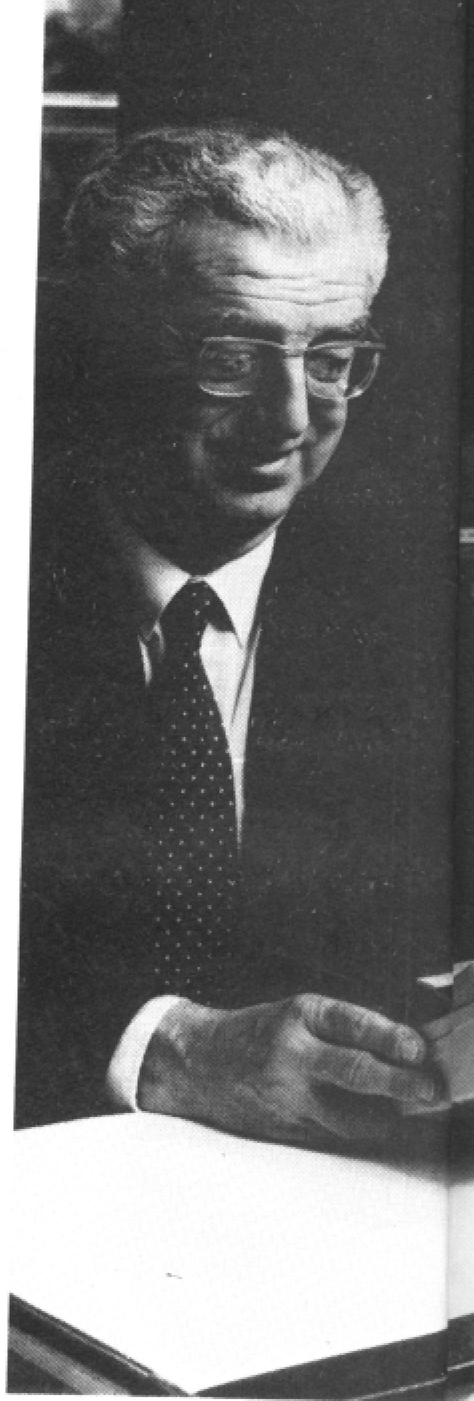
Dragon Data is also strengthening its software catalogue, which already includes more than 80 32/64 titles on cassette or cartridge. Already available is Super Writer II for word processing, some animated adventures are on the way, and there is to be an increasing emphasis on Education.

The plans for peripherals and software show that the 32 is not being forgotten amongst the more exciting possibilities of satellites and suchlike. As Brian Moore said earlier this year, the "new products coming on stream" are aimed to strengthen our position in the home computer market as well as moving us into the accelerated growth area of professional and small business usage".

You may have waited a long time for a solution to the problems of saving and loading, but at last help is at hand in the shape of the dedicated recorder. New users should be more lucky for they will have a chance to buy a Dragon starter pack consisting of a Dragon 32, cassette deck and selected software. Pricing has not been decided yet for this attack on Vic territory, but Ron promises that it will be "highly competitive".

Little is being said at the moment about new micros, except that they will be upmarket to the 64 and running the OS9 operating system (among others, if earlier reports are accurate). But already available is the Dragon Business System — that is the 64, OS9-based applications software, a tv or monitor and another (bigger) printer. The system is being marketed as "your passport to professional software".

As we pointed out last month the OS9 applications software is impressive, and cheap. The range includes various book-keeping packages in addition to database management, spreadsheets and word processing (including Spellcheck and Mailmerge). And if you want to write your own "professional" software, try your hand with Basic 09, Pascal or a C Compiler.



Ron Bosanko – looking forward to a brig fu

Easy to use

Ron is willing to discuss the technical merits of OS9, whose main rival for 6809-based machines is the Flex operating system, but he prefers to emphasise its ease of use. As the promotional brochure points out: "The OS9 family of advanced software is not only more powerful than most other microcomputer software, it is also much easier to understand and to use."

The brochure also points to



bright future marketing the Dragon

another attribute of OS9, its portability: "Software and data can be taken to another computer using the same operating system." As Ron adds, he hopes that the other computer will be one of the new models Dragon Data is developing.

But even if the prices and the packages are right, it's the marketing that can make or break a product. This is where GEC McMichael comes in (in fact the business system brochure is headed GEC-Dragon). Ron has no intention of neglecting the multiple outlets such as Boots, which have been responsible for most of the Dragon 32's UK sales. But he intends to promote the business system through other large chains, such as Rumbelows, which have specific electronics experience, and through independent dealers which he regards as the "primary marketers". Boots itself said earlier this year that it did not expect to be stocking any business-only micros.

Ron is confident that "if we sell it through the right outlets" the business system will be a success. He regards "good High Street electrical and radio independent dealers as ideal". They "made the change from radio to television and now they'll make the change to include microcomputer systems". Importantly, Ron argues that such dealers will be able to give users support, advice and "hand-holding" — doing away with the need for a consultant.

The 64

Interestingly these plans make the Dragon 64 on its own appear like a product without a market. As we've said before if you just want to play games and learn about Basic programming, there's little sense in upgrading to the 64. That machine only comes into its own when you add disk drives and the OS9 software. Perhaps it was the success of the Commodore 64 which prompted Dragon Data to release its 64 ahead of OS9 — it's amazing the power of (often misleading) numbers.

But the operating system and the applications software *have* arrived as Dragon Data is keen to emphasise: "They're in the shops now." Immediate availability is important (unless you've got a hard-to-understand desire to line Sinclair's pockets) because the market is so competitive. Not only is there the challenge of rival Dragon operating systems, such as Flex, there's also the challenge of similar systems running on rival micros. For example, Acorn is expected to release a second processor enabling the BBC B to run the Xenix operating system. Xenix is similar to Unix, as is OS9 itself. There are rumours that Commodore too is thinking about Unix-like system.

The independent dealers which are the business system's hope for success will be stocking the package alongside other GEC McMichael products — those television sets, videos and intelligent telephones. Teletext and viewdata adapters are also on their way, raising those visions of the future again, including satellite-receiving equipment under development which Ron promises will be of a "unique design".

Ron regards cable tv and satellites as being "co-partners". A lot of the country is unlikely ever to be cabled but satellites could provide "100 per cent coverage" — "something we've never been able to do before". But what are the chances of this coming about? Ron argues that if the political decisions are made in time, say before 1987, "the procrastination past that date will affect satellite's chances".

Ron's not sure that the social implications of satellites and cable tv "are that extreme". As he explains "the infrastructure is there now with interactive telephones" and could take "a lot of the chore out of life" while still leaving opportunities for social contact.

The teletext and viewdata adapters stem from GEC McMichael's acquisition last year of a company called Ayr Viewdata. Such acquisitions, and the fact that Brian Moore himself is a GEC man on secondment to Dragon Data, raises the interesting question of GEC's overall communications strategy. Ron points out that GEC McMichael is "a separate product company operating under the overall umbrella of GEC". Under the same umbrella are GEC Computers, specialising in mainframes; another subsidiary covering business applications (Ron's emphasis is on consumer electronics); and Satchwell Control Systems, where Brian Moore was deputy managing director.

Strategy

Brian arrived at Dragon Data last year following the departure of Tony Clarke. GEC had been approached for a replacement by Dragon Data's shareholders — chief of which is Prutech, the technology investment arm of Prudential Assurance, itself an investor in GEC. Working out who's prompting who in this chain of events is difficult. In fact as an independent subsidiary GEC McMichael is unlikely to be informed of GEC's overall strategy, it would have to guess it from the financial targets it is set. And when Brian Moore was asked how long he would be at Dragon Data, and where he would go next, he shrugged his shoulders and said that only GEC itself could give the answer. Neither Ron nor Brian seems concerned about this — presumably it's a small price to pay in terms of the operating independence gained.

In fact it was GEC McMichael that made the initial approach to Dragon Data — and Ron had only met Brian once before. The first approach was prompted by Ron's interest in developing a micro for a component television. From there the talks snowballed so that the two firms are to a certain extent interlinked now. As Ron says: "Dragon Data is unlikely to develop products which we wouldn't be interested in marketing." So if you ask the question "What do you get if you add two GEC men together?", the answer comes back "Dragon peripherals, Dragon micros and Dragon software — and the promise of a whole lot more".■

Creating the very latest in graphic art

***Paul Gale** explains how to program your computer to create your very own modern graphic art.*

THE IDEA FOR this program came to me one evening at home, while I was half-watching a television programme on modern artists. The other half of my brain was engaged in idly perusing the graphics commands in the Dragon instruction manual.

The television programme started to tell the story of how a certain artist's work was inspired by computer graphics. On hearing these magic words my ears pricked up and my brain engaged with the TV. It disengaged only seconds later, when I saw the artist's efforts — my Dragon could do better, I thought!

Programming

Later, I started to consider the idea seriously. How could I program my Dragon to paint "modern art"? At first, I considered the idea of pre-programming certain shapes, PUTting them into arrays, and subsequently GETting them. But I decided that this would be too complicated. What's more, I thought it would be much more fun to let the Dragon make up its own pictures without any help from me!

The program is constructed around the Dragon's RND facility — the first random number "1" determines the initial PMODE to be used. I decided not to use PMODE4, both for programming simplicity and also because black and white or black and green pictures are quite boring. From Line 150 onwards, the way the program runs is dependent on combinations of random numbers.

However, because the Dragon will always compute the same "random" numbers when it is first switched on, it is best to RUN and BREAK the program a couple of times before allowing it to run on uninterrupted.

In the program, lines 270-290 draw a circle and paint it in, the co-ordinates of the circle's centre having been determined in lines 170-240. The PAINT colour is determined by the value of "A" (line 280). As this value is between 1 and 4 you are probably thinking that this will not work for the SCREEN1, 1 colour set. I must admit I thought so too, until I tried it! I was then overjoyed to discover that, in this mode, the numbers 1 to 4 can be used to represent the available colour sets on both SCREEN1,0 and SCREEN1,1. Needless to say, this discovery helped simplify the program enormously.

Line 480 draws an arc at a position determined in lines 350-400. The start point (S) and end point (E) of the arc are determined at lines 430 and 440.

Line 530 re-paints the background, while lines 650 to 670 draw a line, a rectangle or a rectangle filled in with the current foreground colour.

At various points throughout the program there are lines included which give the Dragon the opportunity of returning to ▶

```
99 '****RANDOM COMPUTER ART BY PAUL GALE****
100 I=RND(1000)
110 P=RND(30)
120 IF I<=500 THEN 140
130 PMODE3,1:SCREEN1,0:PCLS:GOTO150
140 PMODE3,1:SCREEN1,1:PCLS
150 IF P<=10 THEN 350
160 IF P>10 AND P<=20 THEN 590
170 X=RND(200)
180 Y=RND(100)
190 Z=RND(52)
200 Q=RND(80)
210 X=(X+Z)
220 Y=(Y+Q)
230 IF X>=252 THEN 170
240 IF Y>=180 THEN 310
250 J=RND(40)
260 W=RND(50)
270 CIRCLE(X,Y),J,4,(W/10)
280 A=RND(4)
290 PAINT(X,Y),A,4
300 GOTO190
310 FORT=1TO3500:NEXTT
320 X=0:Y=0
330 P=RND(100)
340 IF P<50 THEN 100
350 X=RND(252)
360 Z=RND(50)
370 X=(X+Z)
380 A=RND(4)
390 Y=RND(180)
400 Y=(Y+Z)
410 R=RND(60)
420 U=RND(50)
```

```
430 IF U<20 THEN S=.25
440 IF U>20 AND U<40 THEN S=.5
450 E=(S+.25)
460 IF X>=252 THEN 350
470 IF Y>=180 THEN 510
480 CIRCLE(X,Y),(R),(A),1,(S),(E)
490 X=0:Y=0
500 GOTO350
510 IF R<20 THEN 540
520 IF A=0 THEN A=1
530 PAINT(X,Y),(A-1),(A)
540 FORT=1TO3500:NEXTT
550 K=RND(100)
560 IF K<50 THEN 170
570 IF K>=50 AND K<90 THEN 590
580 GOTO100
590 O=RND(188):Y=RND(188)
600 IF (O)=(Y) THEN 590
610 M=RND(250):X=RND(250)
620 IF (M)=(X) THEN 610
630 IF O<60 THEN 650
640 IF O>=60 AND O<125 THEN 660:ELSE670
650 LINE(M,O)-(X,Y),PSET:GOTO680
660 LINE(M,O)-(X,Y),PSET,B:GOTO680
670 LINE(M,O)-(X,Y),PSET,BF
680 FORT=1TO3000:NEXTT
690 IF M<62 THEN 590
700 IF M>=62 AND M<125 THEN 170
710 IF M>=125 AND M<200 THEN 330
720 GOTO100
```

◄ the start or running through the same routine again. Thus you may get a screen filled with circles, arcs or rectangles — or nothing at all.

Musical extras

When I first ran the program, my wife commented that it would be even better with some sort of musical accompaniment. I thought about this, and realised that it could be easily achieved by use of the AUDIO and MOTOR commands. Thus, if you want to add music to your program, simply include an extra line as follows:

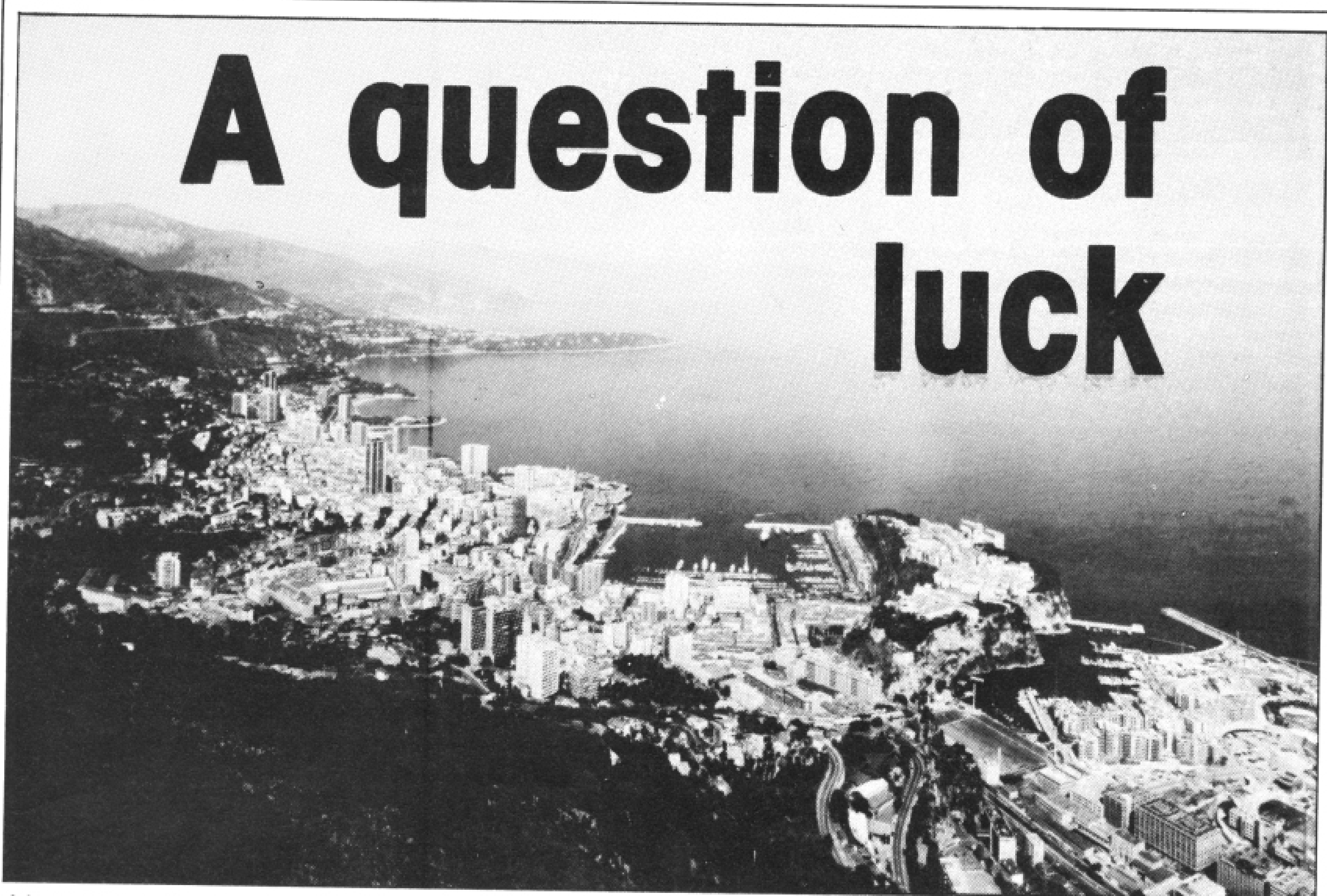
105 MOTOR ON:AUDIO ON

Then, when you have loaded the program, insert a tape of music of your choice into your cassette recorder and depress the PLAY button.

When the program runs, your Dragon will automatically turn your cassette player on, thus providing a unique soundtrack for its own artistic efforts (but don't forget to enter MOTOR OFF and AUDIO OFF when you BREAK the program).

I have run this program for several of my friends and they have all very quickly become fascinated by the patterns and "pictures" drawn by the Dragon. Furthermore, many of them are convinced that the patterns are somehow synchronised with the music! As to whether or not it's art, I'll leave to the critics. However, I can confirm that it's a hit at parties — as long as you don't mind spending an evening trying to prise your guests' eyes away from the television set!■

A question of luck



It's not logic that a physicist turns to when he's in doubt, it's luck. ***John Royds*** *introduces the "Monte Carlo" technique and shows how to use it on your Dragon*

HAVE YOU ever wondered how some of the more complicated problems in, say, physics are solved using a computer? A problem such as calculating the radiation levels in a nuclear reactor, for example, is not a simple one. The answer is that when the problem is as difficult as this then the physicist resorts to luck. In fact the technique is called Monte Carlo to underline the element of luck. However, the end result is no more lucky than is an insurance company making a profit. As far as a reactor is concerned, I'm sure you are glad of that.

There are at least two ways of using the Monte Carlo method. The first requires the programmer to have a good knowledge of probability theory to completely master the method. However, a simple example is shown below.

Suppose you wish to find out the probability of throwing two dice such that they total seven. Well, the answer is 0.16666. The way to calculate this using the Monte Carlo method is to make the random number generator your die. This is possible because the function RND (6) will give an integer between one and six with equal probability — just like a die. Thus you just "throw" this die twice and see what you get — then do it again and again. In fact, about 10,000 times would do. The probability is simply the number of times seven was obtained divided by 10,000. Hence the program in *Figure 1*.

The reason this method is used is because nearly any fool can do it since it is so easy. For example, it would be no problem to modify the program to simulate throwing six dice and then obtaining the probability of some pretty obscure combinations. To do the calculations theoretically, however, gets progressively more difficult. The only problem is that the answer is never exact using the Monte Carlo method — but then neither is life. The computer may give you answers to six figures but you are rarely interested in more than the first two — unless it's money, of course.

The other method of using luck in a program is to use it to choose trial solutions to a problem that you wish to solve on the basis that if you try several, ▶

```
10 SUM=0
20 FOR I=1 TO 10000
30 N=RND(6)+RND(6)
40 IF(N=7) THEN SUM=SUM+1
50 NEXTI
60 PRINT "PROBABILITY=";SUM/10000
```

Figure 1: make the random number generator your die

```
10 DIM  ST(12,6),W(13),F(12),MM(12),P(12
),MT(12,20)
15 INPUT"I/P MEALS BEFORE MEETING SAME
 PERSON";ME
18 REM INITIALISE AND ARRANGE FIRST SITT
ING
20 FORI=1TO12:ST(I,1)=I:F(I)=2:MM(I)=2:P
(I)=2:NEXTI
30 J=1:GOSUB1000
35 REM LOOP SITTINGS
40 FOR J=2TO6
50 FORI=1TO12:W(I)=I:NEXTI
55 REM CHOOSE FIRST GROUP'S FIRST COURSE
```

Continued on page 39

Figure 2: finding a solution

```
60 N=RND(12):IF(F(N)=0)THEN 60
65 ST(1,J)=N
70 O=11:FORL=N TO 12:W(L)=W(L+1):NEXTL
75 REM NOW LOOP THROUGH EVERYONE ELSE
80 FORI=2 TO12:T=0:K=I-INT((I-1)/3)*3:ES
=(J-ME)*2-1:IFES<1THENES=1
85 REM CHOOSE FOR CURRENT COURSE
90 NN=RND(O):N=W(NN):T=T+1
95 REM IF BLIND ALLEY START AGAIN
100 IF(T>99) THEN PRINT"AGAIN":GOTO20
110 ON K GOTO140,170,200
115 REM FIRST COURSE
140 IF(F(N)=0) THEN 90
150 GOTO220
160 REM MAIN MEAL
170 IF(MM(N)=0) THEN 90
172 NF=ST(I-1,J)
173 REM MET RECENTLY? IF SO CHOOSE AGAIN
174 FOREE=ES TO(J-1)*2
176 IF(MT(N,EE)=NF)THEN 90
178 NEXTEE
180 GOTO220
185 REM PUDDING
200 IF(P(N)=0) THEN 90
202 NS=ST(I-1,J)
203 REM MET RECENTLY? IF SO CHOOSE AGAIN
204 FOREE=ES TO(J-1)*2
206 IF(MT(N,EE)=NF)THEN90
208 IF(MT(N,EE)=NS)THEN90
210 NEXTEE
220 FORL=NN TO O:W(L)=W(L+1):NEXTL
230 O=O-1:ST(I,J)=N:NEXTI:GOSUB1000
890 REM PRINT ARRANGEMENT FOR THIS SITTI
NG
900 FORI=1TO12:PRINT"ST,F,MM,P";ST(I,J);
F(I);MM(I);P(I):NEXTI
950 NEXTJ
990 GOSUB1200        995 END
998 REM SUBROUTINE TO UPDATE WHO COOKED
WHAT AND WHO MET WHOM
1000 FORL=1TO10STEP3
1010 F(ST(L,J))=F(ST(L,J))-1
1020 MM(ST(L+1,J))=MM(ST(L+1,J))-1
1030 P(ST(L+2,J))=P(ST(L+2,J))-1
1040 NEXTL
1050 FORL=1TO10 STEP 3
1060 A=ST(L,J):B=ST(L+1,J):C=ST(L+2,J)
1070 MT(A,J*2-1)=B:MT(A,J*2)=C
1080 MT(B,J*2-1)=A:MT(B,J*2)=C
1090 MT(C,J*2-1)=A:MT(C,J*2)=B
1100 NEXTL:RETURN
1105 REM SUCCESS! O/P RESULTS
1200 FORL=1TO12:PRINTL;:FORJ=1TO6:PRINT
USING"##";MT(L,J*2-1);MT(L,J*2);:NEXTJ:P
RINT:NEXTL              1210 RETURN
```

◀ you may stumble on a solution which is good enough for your purposes. For this method to be of use there is no need to have any knowledge of probability and so anyone can do it. I will go through a program now that uses this method to solve the sort of problem that you are quite likely to encounter.

You are a member of a supper club. In this club, each couple has a meal with two other couples. Each couple cooks one of the three courses but they all eat at the home of the couple that supplies the main dish. The requirements to be satisfied when arranging the rota are that (1) every couple cooks the same number of starters, main meals, and puddings when taken over a long period and (2) the time between couples meeting again is as long as possible. Easy, you think. Well, try it by hand for 12 couples and six sittings. Although there are 20 million ways of choosing a single sitting, choosing just six that will satisfy the above requirements is not so easy.

A program that will find a solution (eventually) is shown in *Figure 2*. It is not a complicated program because it does not attempt to exhaustively go through all possible combinations for a sitting, it merely tries solutions at random. The conditions for an acceptable solution are that all couples cook two starters, two main courses, and two puddings and that couples do not meet at a meal again until ME meals have past. The program is for 12 couples and six sittings, though this can be easily changed.

The arrays are as follows:

F(N)	No of first courses couple N has cooked
MM(N)	No of main meals couple N has cooked
P(N)	No of puddings couple N has cooked
W( )	An array holding couples not yet allocated for current sitting
MT(N,J×2) MT(N,J×2+1)	Holds which couples couple N met on the Jth sitting

For group L for the Jth setting:

ST(3×(L−1)+1,J)	Holds who cooked first course
ST(3×(L−1)+2,J)	Holds who cooked main meal
ST(3×(L−1)+3,J)	Holds who cooked the pudding

The first sitting is done "by hand", so to speak, since there are no restrictions for that sitting. The program then arranges the rest by randomly choosing a couple for each particular course and group and checking that that couple satisfies all the requirements.

While it is possible that this program may be of use to some of you, its main purpose is to show a simple method that can be used to solve some quite complicated problems that are met in everyday life. Anyway, it makes a change from zapping aliens with your Dragon. ■

Code with no Þxed abode

Stuart Sampson follows the course of the nomadic code

THE DRAGON may have his lair, but the programs in his memory can be as nomadic as Bedouins. if you know how to write them that way. The relocatable program or, to be more precise. the position-independent program, is a real bonus to the 6809 programmer. Of course other processors can manage short position-independant routines, but there is no length limit on the Dragon's processor.

What is the advantage of writing nomadic code? The answer comes easily to any Basic programmer enhancing their latest masterpiece from the stock-pile of machine code they have collected over the years. As they get them out and arrange them, working back from Memory Top. they may well Þnd that they end up away from their location of origin. It would be good if they worked without alteration.

Machine-code programmers may also bless nomadic coding for their utilities. How nice to be able to load a monitor into screen space to service a major epic without clashing with any of it. Dragon Data has thoughtfully provided commands to make this easy, the CLOADM command can be given an offset to service the program's wander-lust, and the Dragon DOS LOAD command accepts a speciÞed address to load the program and corrects the exec address accordingly.

The simple routines published for speeding up scrolls and other graphics effects are almost all relocatable. As with other processors it is quite difÞcult to make routines of than 100 bytes any other way, but push up the length and watch other computers fall by the wayside.

What makes a program grow roots? Answer Ñ any absolute addressing involving locations within the program. The worst offender is Extended Addressing with the JMP and JSR instructions.Jumps require you to specify the actual address of the destination, and of course, when you move the program this has to be changed.

The Þrst step to position-independance is to use the branch instruction. Even the Z80 can manage this, provided it is aiming at a point not more than 126 bytes back or 129 bytes on from the address of the instruction itself. Z80 people call this a relative jump. In 6809 parlance it is a branch of the short or normal variety. However by using the 6809's long branch, anywhere within the 64K of addressable memory can be reached. One can ßit about memory with the grace of a bird, and for something else to sing about, you can branch to a subroutine, in either mode. Watch out for Z80s with shot-guns while singing this song though!

For those who Þnd branch displacements confusing and haven't got an assembler to take care of it here are some hints. If the displacement is zero or the branch does not happen, the program counter goes on to point to the next instruction, so it is relative to the address of the next instruction that the displacement is calculated. The displacement is added to the no-branch address by means of signed arithmetic. In the case of normal branches, a number exceeding 127 (8,H7F) has its top bit set and is deemed negative, so the branch goes back. If some mean person mentions - don't panic, just subtract 256 from any number above 127 to get its signed value. Conversely, to derive the displacement for a backwards branch, count back from the address of the next instruction to your destination to get a negative value, then add 256.

Long branches work on the same principle, except they need 2 byte, that is, 16 bit, displacements. In this case you do not need to think of signs, picture the memory map as a closed loop and think of "backwards" branches as going forward but taking the long way round the memory map.

6809 instructions for conditional long branches have two byte op-codes, as well as needing a two byte displacement, so remember the extra length when calculating displacements, backwards particularly.

Some monitors and all assemblers have the means of working out displacements for you, with some way for you to tag or label the destination. At least one monitor will automatically select one or two byte values for long and normal branches, but many assemblers expect you to specify and throw up an error if a normal branch is out of range. What's more the process of assembly is sequential and for forward branches the destination label has not yet been found when it tries to assemble the branch. This necessitates a second pass of some sort.

If you are stuck with a simple monitor, providing it gives a tabular memory dump with a cursor, you can get a displacement quite easily by counting. The Þrst skill to master is counting backwards in hex: F E DC BA 98 76 5 4 32 10. Perhaps you get "FED up with Counting BAckwards 9876543210".

The table will give rows of 8. or more rarely 16, bytes. You get the Þrst hex digit of the value by setting the cursor on the address after the displacement, and stepping vertically two rows at a time for rows of 8, or one for 16s. until you end up before the destination. Count backwards if going up, forwards for down. To get the second hex digit. count along forwards to the destination.

If you exceed 7 vertical steps forwards or pass 8 going back, you need a long branch. You then need to count pages to get the high byte of the displacement.

Note that to go &HBO forward you need a long branch with a displacement of 00 80. Don't be tempted to shorten displacements between 00 80 and 00 FF because you see a zero.

Removing JMPs (7E) and JSRs (BD) will prevent most crashes due to execution in the wrong place. There are, however. a few pitfalls left for the ambitious, that involve absolute addresses getting into registers and then into the program counter. A technique that can do this is to load a return address into a register and push it. This might be a "home" address for a multi-task program, whose routines end with an RTS and can be used as subroutines or used direct. In the latter case the RTS pulls the home address into the program counter and control returns to the main menu. In ,this case, or any TFR or EXG to the programme counter, the value must not be absolute.

Another cause of immobility is tables of data within the program coding. Move the program and the table pointer value will miss. Both this and the problem mentioned above can be resolved by using two of the 6809's most powerful features.

The designers of the 6809 decided that all the logic that services branches should be made available to the programmer_So Þrstly they introduced program counter relative addressing. Fancy eh! It is really a posh name for a system all processors use for at least two other functions, Þrstly the branch, which could be called jump PC relative (you can assemble an awkward instruction to do this: 6E 8C dd). The second is our friend immediate. LDA

◄#N is, in fact, loading PC relative d=0, that is the byte following the op-code. Don't try it though, it will try to execute the data as well!

The next feature is load effective address. Instead of doing something with the location that is addressed in the chosen addressing mode, the address itself is put into the register. This puts all the circuits that give the powerful addressing modes of the 6809 in the hands of the programmer as a 16 bit number cruncher.

In our case we can put it all together to get an address within the program into a register irrespective of the program's position in the memory map. We can then point to tables, push return addresses and other tricks. We load effective address in the PC relative mode. Don't be fooled into thinking the 6809 is doing some magic, all it has to do is to add our displacement to the PC contents and put it into the chosen register.

All I have said about branch displacements applies to PC relative addressing displacements, so you now know how to make a program totally nomadic. Unfortunately all this makes it very hard to service. There is nothing like a few absolute addresses to show where you are going. Program development is easier with roots down so I recommend non-assembler programmers to use JMP relative opera-convert them later. However PC relative operations may need longer op-codes than their absolute equivalents. By popping in a NOP as padding in development, you don't alter the number of bytes when you convert and foul up other displacement values.

Most programs need work space, and you may want it to move with the program. To save a lot of PC relative hassle, you can set up a direct page relative to the program position and use it for workspace. The limitation is that you must only move the program in discrete 256 byte steps, and there is only one 256 byte page as moveable workspace. What you do is set X to an address within the desired workspace page using LEAX PC rel. Then TFR X to D, so the address high byte ends up in A. Then TFR A to the direct page register. From then on all direct addressing will point to workspace whose position relates to the program. Remember with the Dragon to reset DP to zero before returning to Basic.

So, having shaken off the shackles of absolute addresses, your program can roam the RAM, hide in vacant memory and zap anything in sight. It's a pity Dragon's Basic wasn't written this way, they wouldn't need the extra ROM for the 64K.

To end this article I am going to take an example which illustrates the points we have described, and perhaps you might find a few other things new to you in it too. The routine is written as a subroutine, as if it was part of a larger program or called from Basic, just to find a realistic way to end it! Unfortunately you cannot use it in its present form, mainly because it has divorced itself from Basic by moving the direct page, and then hopes to use some Basic subroutines which themselves need the DP at zero. Regard it as an example only.

1.	30 8D FE FC	LEAX,PCR	Long displacement of minus &H104 to set X to start of work page.
2.	1F 10	TFR X D	16 bit transfer.
3.	1F 8B	TFR A DPR	Direct Page register now set to page before program.
4.	8D 1A	BSR @17	Calls subroutine to input and display character, @ line 17.
5.	97 00	STA 00	Stores first input in workpage.
6.	8D 16	BSR @17	Gets next character.
7.	97 01	STA	Stores second input.
8.	30 8C 1B	LEAX,PCR	Loads X with start of Day Abbreviation data table.
9.	10 BE 00 07	LDY #7	Initialises day count in Y.
10.	DC 00	LDD 00	Gets both inputs from workpage into Double Accumulator.
11.	10 A3 81	CMPD,X++	Compares D with first two letters in table, bumping X up by 2 to point at next element.
12.	26 01	BNE	If not found skip next instruction.
13.	39	RTS	End of routine if found.
14.	31 3F	LEAY,Y	Decrement Y, using 4-bit offset indexing with Y as source reg.
15.	26 F6	BNE @11	Backwards short branch if Y is not zero to repeat search.
16.	39	RTS	Program end, abbreviation not found.
17.	BD 80 06	JSR @KBD	Call keyboard scan. Absolute address required as it is not within the routine.
18.	34 02	PSHS A	Preserve A from next subroutine.
19.	BD 80 0C	JSR @CHRW	Echo character to screen. Also an absolute address.
20.	35 82	PULS A PC	Pulls A and PC off stack, acts to restore A and return.
21.	53 41 46 52 54 48 57 45 54 55 4D 4F 53 55	SA FR TH WE TU MO SU	Day table in reverse order.

The program could be written with absolute addressing, in particular:

1.	8E 3F 00	LDX #3F00	Fixes position of workpage, but there's scant advantage in using lines 1-3 in this case.
4.	BD 40 24	JSR 4024	Absolute address for input subroutine.
5.	B7 3F 00	STA 3F00	Extended version assuming DPR not set by lines 1-3.
6.	BD 40 24	JSR 4024	Input another character.
7.	B7 3F 01	STA 3F01	Store in next location.
8.	8E 40 2E	LDX #402E	Absolute addressing of table.
10.	FD 3F 00	LDD 3F00	Load D from workspace.

Hex dump illustrating getting displacements from dumps

```
=4000

30 8D FE FC 1F 10 1F 8B 8D 1A 97 00 8D 16 97 01

30 8C 1B 10 8E 00 07 DC 00 10 A3 81 26 01 39 1F

3F 26 F6 39 BD 80 06 34 02 BD 80 0C 35 82 53 55

53 41 46 52 54 48 57 45 54 55 4D 4F 00 00 00 00
```

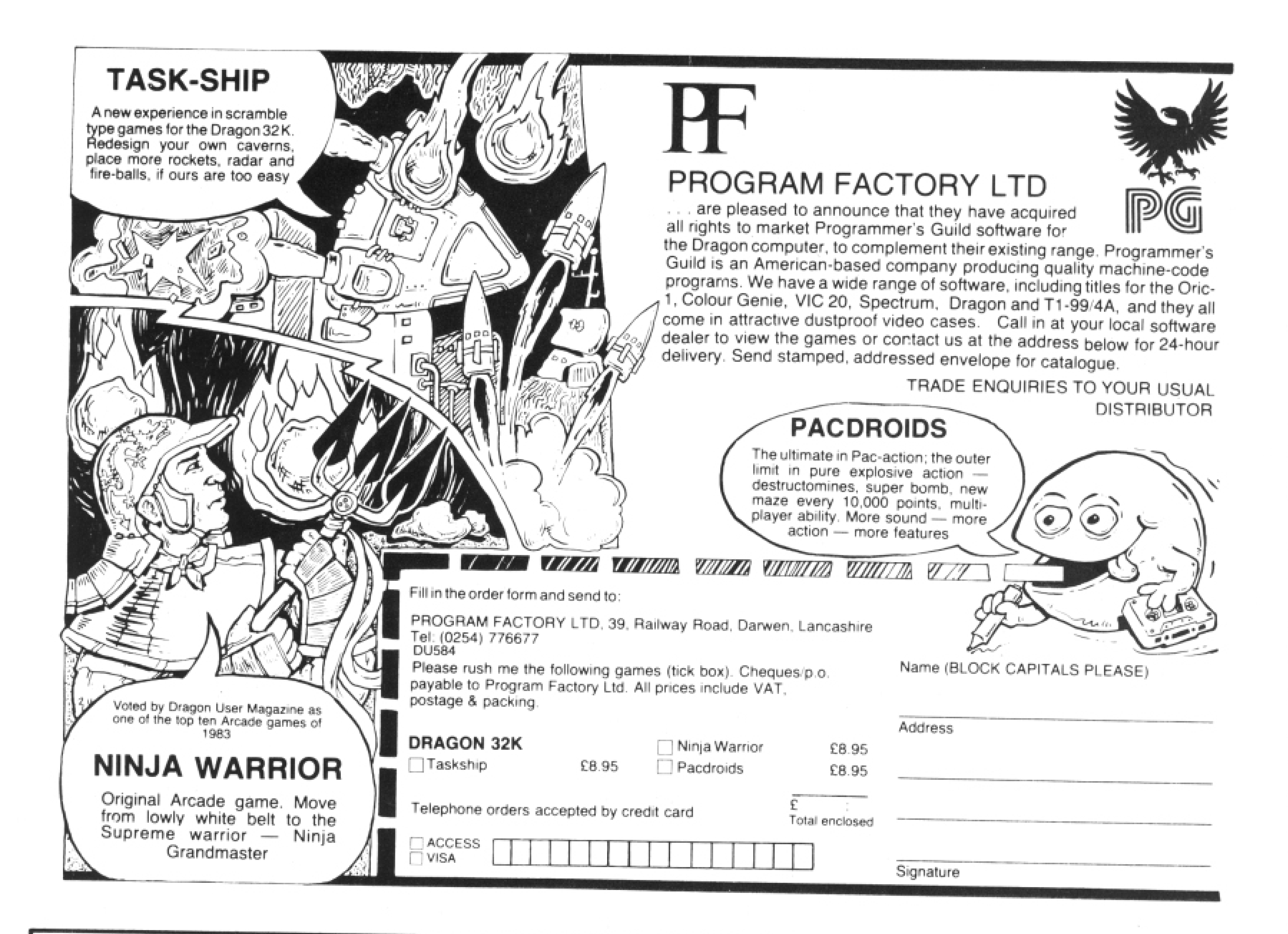
Its function is to accept two characters from the keyboard, echo them on the screen and reflect in the Y register which day of the week they stand for, 1 for Sunday up to 7 for Saturday, and 0 if the input is invalid.

The routines called from Basic are @KBD, which waits for a key press and returns the ASCII of the key pressed in A, and @CHRW which prints the character at the cursor position. I assume it corrupts the contents of A for this example.

The program is totally nomadic, but where I give the absolute addressing alternatives it is as if the origin is at &H4000, and the work page will be &H3F00 to &H3FFF. I have numbered the instructions rather than use labels.

As there are no conditional jumps in the 6809 instruction set, there is no way to substitute for lines 12 and 15. However, you can substitute for long conditional branches during development by branching over an absolute jump.

I hope machine code users have found a few titbits in this article, even if it is ammunition against supporters of other processors! ■



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Miscellaneous mains noises

***K Garwell's** techniques to prevent mains noise*

FROM ONE or two letters in previous issues of *Dragon User*, it is evident that there are fellow sufferers from the effects of mains noise. I can well remember that sinking feeling, wondering whether I should get the edit on tape before losing the program. As well as being frustrating, noise can cause very mysterious occurrences. In my own case one favourite was that whatever command I typed produced "SN ERROR", whilst on other occasions @ signs seemed to be the in thing. Before going on to show how the effects of mains noise can be isolated, a word or two to consider just exactly what mains noise is.

I use the word "noise" generally, and perhaps a bit loosely, to mean either short disconnections of the supply, or high frequencies introduced into the mains supply by switching on other equipment, particularly motors. This high frequency noise can travel some distance along mains cables and is not necessarily generated in your own home.

Short breaks in the mains supply are noticeable if the lights are on, and occasionally such short breaks will cause the TV picture to break up or even disappear momentarily. The Dragon, however, is very resilient to breaks of this sort. I have never had any trouble from this although our lights do blink occasionally.

No, the effect that does cause trouble, and to which the Dragon along with other machines is susceptible, are the high frequency components that occasionally appear. These components may be present on either the live or neutral lines or both.

There are two principle solutions to the problem, one of course noticeably cheaper than the other. However, neither solution is so expensive that one needs to continue the frustration of lost programs. As I mentioned earlier, I was in the situation at one time that I could not be certain of completing an edit before losing the program. Now that situation has completely changed. Programs work perfectly and I only save really complicated edits before testing.

The first solution to the problem is a simple filter, such as is shown in figure 1. This consists of two inductors L1 and L2 which are in series with the live and neutral from the mains. On the equipment side, one capacitor, C3, is connected between live and neutral and two others C1 and C2 are connected from live and neutral respectively down to earth. This configuration is very effective and is the one most commonly used for a wide variety of equipment which either generates interference or is susceptible to it. To simplify the way in which it works one may imagine the inductors as offering a barrier to the noise, whilst the capacitors bypass any remaining noise to the earth line.

The second solution, which is more expensive and correspondingly more effective, is an isolating transformer as shown in figure 2. T1 indicates the transformer, the primary of which is connected to the supply and the secondary to the equipment. A screen between the two windings further enhances the isolation. A toroidal transformer is most convenient because of its small size and low losses. This arrangement is very effective and indeed is the one I use.

Having discussed the two schemes we now come to the construction. This is quite straightforward for either and the components are readily available.

Figure 3 shows a constructional diagram of a filter unit. The capacitors C1, C2 and C3 are in fact encapsulated into one small module with three wires coming out, two coloured black (BK) and one ►

THE FILTER items and small plugs and sockets can be obtained from: MS Components Ltd, Zephyr House, Waring Street, West Norwood, London SE27 9LH.

Filter items:
Cat No 201 suppressor 61p.
Cat No 204 suppressor £1.79.
Cat No 1065 socket 89p.
Cat No 1066 plug £1.26.
A plastic box large enough for the transformer and four of the 6-amp sockets (which will have to be cut to fit) is Cat No 4069 grey plastic box 190 × 110 × 60mm £1.94.
VAT should be added to the above prices but postage is included.
The transformer is obtainable from: ILP Electronics Ltd, Graham Bell House, Roper Close, Canterbury, Kent CT2 7EP.
Transformer Part No 32230 costs £8.46 plus postage and packing £1.72.
VAT should be added to the above (£1.53) giving a total of £11.71. (All prices approximate.)

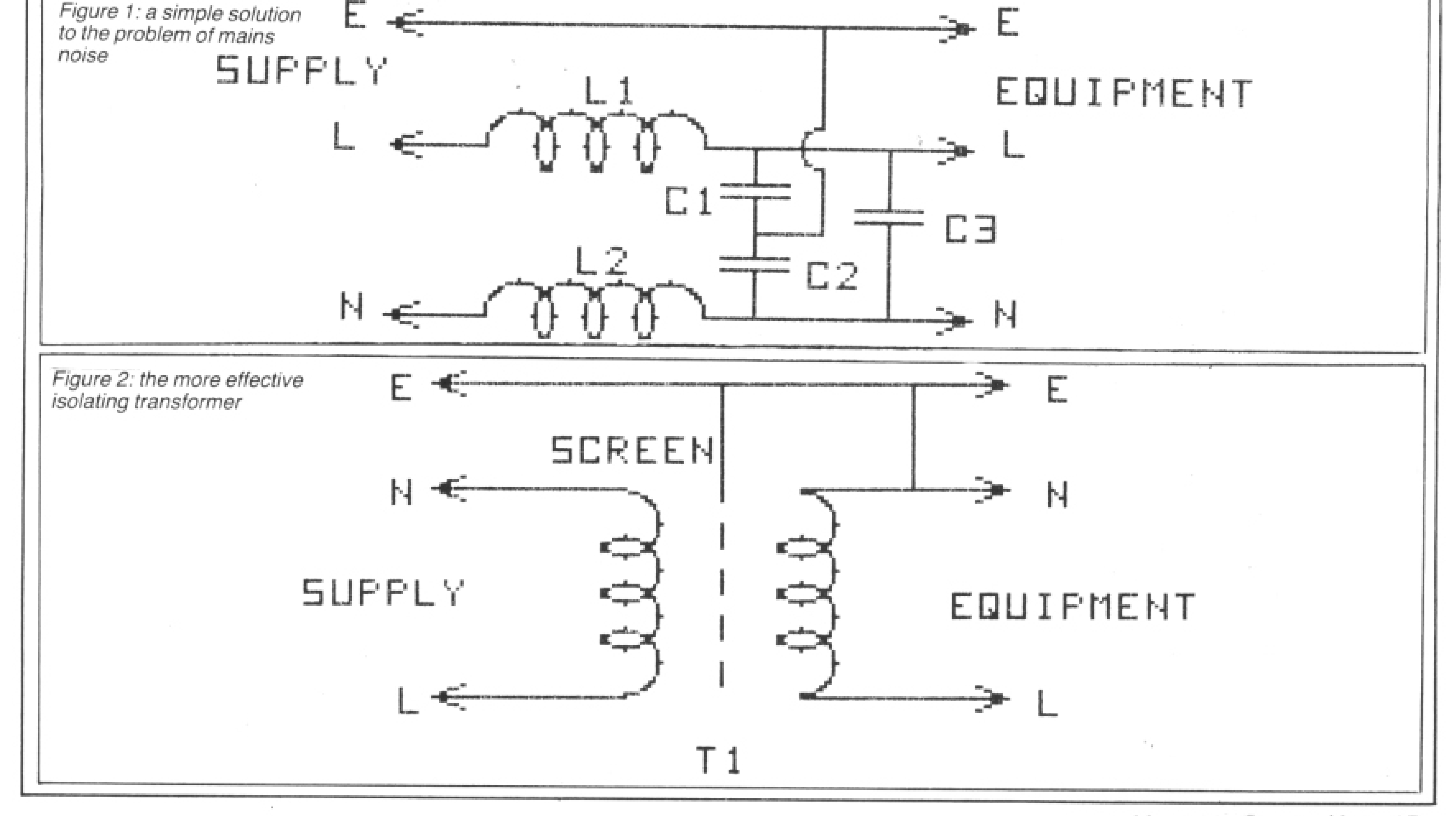
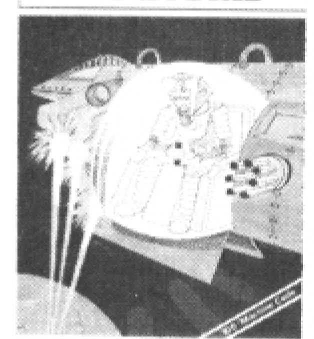


Figure 1: a simple solution to the problem of mains noise

Figure 2: the more effective isolating transformer

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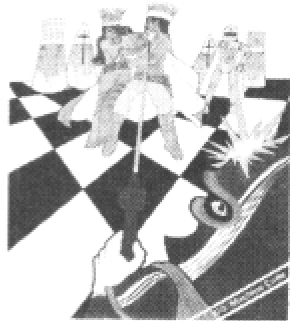
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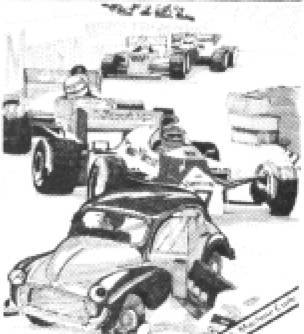


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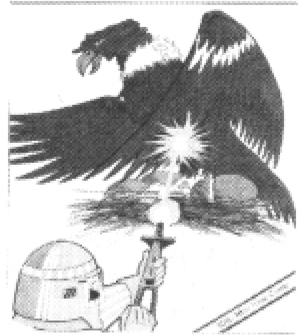
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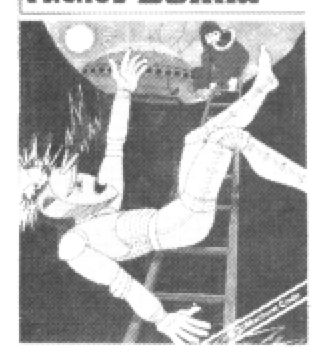
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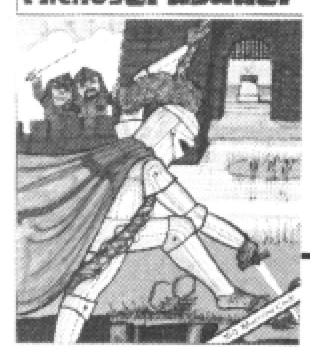
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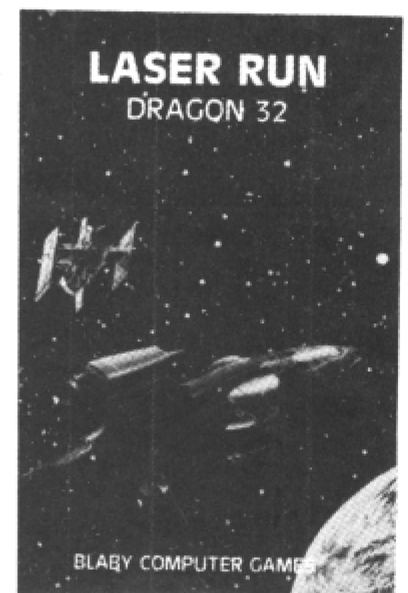
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◀greeen/yellow (GY). The inductors are also encapsulated, the module having four wires, two black and two blue (BE).

I constructed a unit from a standard double surface mounting box with two 13-amp sockets. These are available from electrical shops and many of the chain stores. The two modules are small enough to fit into the space behind the sockets. A length of three-core mains cable (5- or 6-amp) with a suitable plug completes the unit. The connections between this and the blue leads from the inductor module can be made by means of a small screw connector if you do not have access to a soldering iron. The connections are all shown in figure 3. It is important that the two black wires are connected to the socket and the two blue ones to the mains supply via the cable and plug. The chief difficulty is getting the live and neutral connections the right way round because they are not distinguished on the inductor module. Some form of simple continuity test is required to find out which of the blue wires is connected to which of the socket connections. This is most easily done with a multimeter or lamp and battery.

I have suggested using a ready made box but this does have the disadvantage of only two sockets. The inductor unit will handle up to 4 amps, which is sufficient for the equipment. The plug for the supply should be fused at 3 amps.

The second arrangement is just as easy to build, the only problem being that the transformer is too large to go into anything like the surface mounting box that I suggested for the filter unit. A piece of hardboard and a few minutes carpentry will solve this problem however. It also means that the box can be made big enough to accommodate more than two sockets. Standard 13-amp sockets can be used. Figure 4 shows the wiring. The two connections to the supply are coloured orange (OR) and the two connections to the socket are red (RD). There is no right and wrong way round for the wires so long as the orange wires go to the supply and the red to the socket. Again a small screw connector may be useful for connecting the transformer wires to the mains cable. Connections to other sockets are indicated by the arrows. Yes, the drawing is correct, the neutral and earth connections of the socket are connected together. Fit a 3-amp fuse in the supply plug for this arrangement also.

The transformer is rated at 80va which is sufficient for the Dragon, tape recorder, printer and a small black and white portable TV. However, if you are using a large colour TV then it should be run direct from the mains supply, preferably from the same point that the transformer unit is plugged into. Use a two-way adaptor if necessary.

An alternative to 13-amp sockets, which are rather large, 6-amp sockets are available. They are about one and a quarter inches square and they make a tidier arrangement altogether, but remember plugs will be required as well. The sockets clip into a rectangular hole.

Now which to use, the filter or the transformer? The best answer I can give is that if you have an occasional problem then the filter should be sufficient. Otherwise I would advise you to go for the transformer. ■

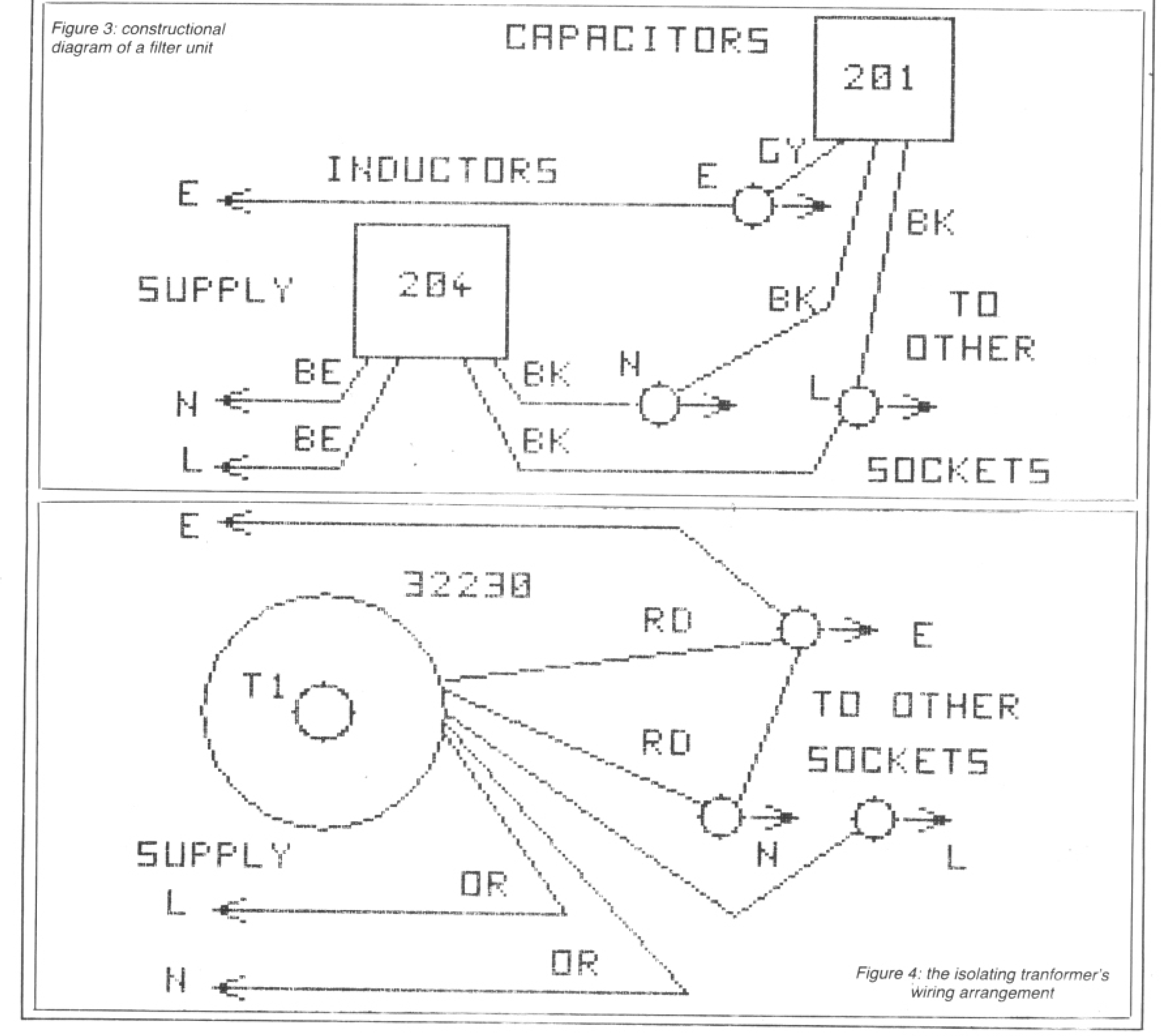


Figure 3: constructional diagram of a filter unit

Figure 4: the isolating tranformer's wiring arrangement

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String Input

From John Boyes in Liverpool

THIS SHORT program enables one to input a character string using the right joystick in a manner similar to that used in some arcade games.

You may notice that the program uses a few tricks which are available to users but are not explained in the manual. In fact they are not covered in any of the books on the Colour Computer either.

```
5 REM JOYSTICK STRING INPUT -- J, BOYES, -- NOV 83,
10 CLS:M$="":FOR I=0 TO 29
20 J=226+5*I+INT(I/6)*2
30 IF I<26 THEN PRINT @J,CHR$(65+I) ELSE READ A$:PRINT @J,A$
40 DATA ".","  ","RUB","END":NEXT I:I=0:J=&H400+226
50 A=PEEK(J+5*I+INT(I/6)*2)
55 A=(A OR 64)-(A AND 64) 'SPACES ESSENTIAL
60 POKE J+5*I+INT(I/6)*2,A
70 FOR K=0 TO 164-A:NEXT K
80 IF NOT A AND 64 THEN 50 'SPACES ESSENTIAL
90 A=JOYSTK(0):K=(A<15)-(A>48)
95 IF K THEN SOUND 220,1:I=I+K:I=I-30*((I<0)-(I>29))
100 IF PEEK(65280) AND 1 THEN 50 'SPACES ESSENTIAL
110 IF I<26 THEN M$=M$+CHR$(65+I)ELSE IF I<28 THEN M$=M$+CHR$
    (I+5-15*(I<27)) ELSE IF I>28 THEN 130 ELSE IF M$<>""
    THEN M$=LEFT$ (M$,LEN(M$)-1)
120 PRINT @100,M$:SOUND 1,1:GOTO 50
130 END
```

Nimitron

From V M Jamooji in Surrey

THIS COMPUTER game is based upon the ancient Chinese game of Nim. It is a game of strategy and planning. You play against the computer to eat the stars from the board and the winner is the one who eats the last star. At the end of the game the percentage of games that you have won is displayed along with the corresponding skill rating. Sound and colour are used in the game.

To save readers the trouble of typing in the program, copies are available, on cassette, price £3 (including p&p) from V M Jamooji, 32 St Albans Road, Cheam, Surrey.

Program notes

90-120	Reserves string storage and gives a welcome to the game.
130-150	Gives instructions if needed.
160-190	Sets the number of games to be played.
200-230	Draws the board.
240-290	Who plays first?
300-380	Player enters move (checks are made to see if it's legal).
390	Updates board.
400	Redraws the updated board.
410	Checks for a win.
420-690	Logic to determine computer's move.
700	Checks for a win.
710-760	Output computer's move and redraw the board.
770	Returns control to 300 so player can enter next move.
780-800	Special part of computer's "logic".
810	Computer loses — score updated; message printed; control transferred.
820	Computer wins — score updated; message printed; control transferred.
830	Pause (to read message); control loops back to start next game.
840	Score converted to a percentage.
850	Percentage outputted.
860-910	Corresponding skill level calculated.
920-950	"Game over".
960-980	Input of data subroutine.
990-1140	Instructions subroutine.
1150-1220	Board printing subroutine.
1230-1260	Data for skill ratings.

Variables

V1, Y1, Y2, Y3	Markers used to determine the computer's logic.
SCORE	Score of the player.
PER	Percentage scored by player.
A$	Name of player.
B$	General purpose input string.
A(1),(2),(3)	Stores the board on which the game is played.
I	General purpose counter.
II	Counts number of games played.
M	Marker for positioning of board on screen.
NO	Number of games to be played.
RE	Variable to register how

	many stars a player removes from the board.
RO	Variable to register which row the stars were removed from.
W	Computer's equivalent to RE.
Z	Computer's equivalent to RO.

```
10 '***************
20 'GAME NIMITRON *
30 'BY--          *
40 '     V.JAMOOJI *
50 '              *
60 'DATE: 11/1/84 *
70 '***************
80 '***************
90 CLEAR500:CLS:PRINT"PLEASE TYPE IN YOUR NAME":INPUTA$:SOUND100,1
100 CLS:PRINT@194,"WELCOME TO THE GAME OF NIMIT":PRINT@267,A$
110 B$="O2L4GGL2GDL4BBL2BGL4GBO3L2DDL4CO2BL1AL4ABO3L2CCO2L4BAL2BGL4BGL2ADL4F£A;L
1G"
120 PLAY"T10"+B$:CLS
130 PRINT"WOULD YOU LIKE INSTRUCTIONS"
140 GOSUB960
150 IFB$="Y"THENGOSUB990
160 CLS:PRINT"HOW MANY GAMES DO YOU WANT"
170 PRINT"TO PLAY ";A$:GOSUB960
180 NO=VAL(B$)
190 FORII=1TONO
200 CLS:PRINT@0,"GAME ";II;
210 PRINT@32,"*******";
220 FORI=1TO3:A(I)=RND(6)+1:NEXTI
230 M=66:GOSUB1150
240 PRINT@113,"DO YOU WANT TO"
250 PRINT@145,"PLAY FIRST ?"
260 GOSUB960
270 PRINT@113,"               ";
280 PRINT@145,"             ";
290 IFB$="Y"THEN300ELSE420
300 PRINT:PRINT@369,"REMOVE ?";:GOSUB960
310 N=N+1
320 RE=VAL(B$)
330 PRINTRE;"    ";
340 PRINT@401,"ROW    ?";:GOSUB960
350 RO=VAL(B$)
360 PRINTRO;
370 IFRO<1ORRO>3THENN=N-1:GOTO300
380 IFRE<1ORRE>A(RO)THENN=N-1:GOTO300
390 A(RO)=A(RO)-RE
400 M=64:CLS:PRINT@0,"GAME ";II:PRINT@32,"******";:GOSUB1150
410 IFA(1)<=0ANDA(2)<=0ANDA(3)<=0THEN810
420 V1=0:Y1=0:Y2=0:Y3=0
430 IFA(1)=A(2)ANDA(3)>0THEN590
440 IFA(2)=A(3)ANDA(1)>0THEN620
450 IFA(1)=A(3)ANDA(2)>0THEN 560
460 FORI=1TO3
470 IFA(I)<>1ANDA(I)<>2ANDA(I)<4ORA(I)>3THEN490
480 V1=V1+1
490 NEXTI
500 IFV1=3THEN780
510 IFA(1)>A(2)THENY1=A(1)-A(2)ELSEY1=A(2)-A(1)
520 IFA(2)>A(3)THENY2=A(2)-A(3)ELSEY2=A(3)-A(2)
530 IFA(1)>A(3)THENY3=A(1)-A(3)ELSEY3=A(3)-A(1)
540 IF A(3)>=Y1 AND A(3)>0 THEN 590
550 IF A(1)>=Y2 AND A(1)>0 THEN 620
560 W=A(2)-Y3
570 Z=2
580 GOTO640
590 W=A(3)-Y1
600 Z=3
610 GOTO640
620 W=A(1)-Y2
630 Z=1
640 IFV1<>3THEN660
650 W=A(Z)-3:GOTO680
```

Continued on page 53

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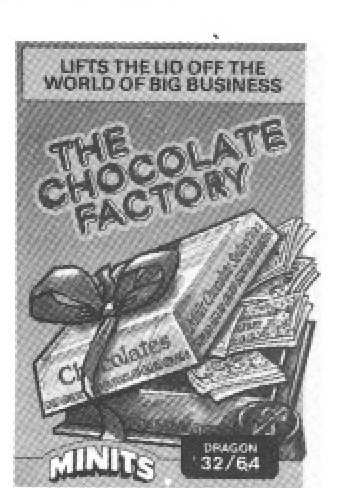
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```
660 IFW<>0THEN680
670 W=1
680 '
690 A(Z)=A(Z)-W
700 IF A(1)<=0ANDA(2)<=0ANDA(3)<=0THEN820
710 IF N/2=INT(N/2) THEN M=66ELSE M=322
720 IFB$<>"Y"THENM=322
730 GOSUB1150
740 PRINT@113,"COMPUTER:";
750 PRINT@145,"REMOVES";W;
760 PRINT@177,"ROW";Z;
770 GOTO300
780 IFA(1)>A(2)ANDA(1)>A(3)THEN630
790 IFA(2)>A(1)ANDA(2)>A(3)THEN570
800 GOTO 600
810 SOUND20,3:SOUND150,9:SCORE=SCORE+1:T=T+1:PRINT:PRINT:PRINT:PRINT:PRINT"CONGR
ATULATIONS "A$;".":PRINT"I'D BETTER CHECK MY WIRING!!!":GOTO830
820 SOUND150,3:SOUND20,9:T=T+1:PRINT:PRINT:PRINT:PRINT:PRINT"HA HA ";A$;" I'VE B
EATEN YOU!!!"
830 PLAY"T2P1":NEXTII
840 PER=INT(SCORE/T*100)
850 CLS8:PRINT@7,"FINAL SCORE=";PER;"%";
860 IFPER<33THENC=0:GOTO900
870 IFPER<55THENC=5:GOTO900
880 IFPER<75THENC=10:GOTO900          890 C=15
900 FORI=0TOC-1:READB$:NEXTI
910 FORI=1TORND(5):READB$:NEXTI
920 PRINT@128,"PERSONAL RATING: ";B$;
930 PRINT@224,"":PRINT@256,"        ***********************":PRINT@288,"       * G
A M E    O V E R *":PRINT@320,"      ***********************";
940 B$="V10O2L4GGL1GP4V14L4GGGL1GP4V18L4GGGL2BL4BBBV22L2BL4BBBV26O3L2DL4DDDL2DL4
DDDV30L1GL2.F£L4C£L2EDCO2AGGGGGGGGGG":PLAY"T15"+B$
950 END
960 B$=INKEY$:IFB$=""THEN960
970 SOUND100,1                            980 RETURN
990 CLS:PRINT"INSTRUCTIONS:"
1000 PRINT"  THERE ARE 3 ROWS OF STARS"
1010 PRINT"  THESE MAKE UP A BOARD."
1020 PRINT"  NOW ";A$;", YOU PLAY AGAINST"
1030 PRINT"  ME TO REMOVE 1 OR MORE STARS"
1040 PRINT"  FROM A CHOOSEN ROW."
1050 PRINT
1060 PRINT"  THE WINNER IS THE PLAYER"
1070 PRINT"  (OR COMPUTER!) WHO TAKES THE"
1080 PRINT"  LAST STAR(S) FROM THE BOARD."
1090 PRINT:PRINT:PRINT:PRINT"PRESS ANY KEY TO CONTINUE":GOSUB960
1100 CLS:PRINT@130,"A WORD OF WARNING:"
1110 PRINT@166,"ONLY A SKILLFUL PLAYER"
1120 PRINT@198,"CAN BEAT ME."
1130 PRINT@226,A$;" YOU HAVE BEEN WARNED!!"
1140 FORI=1TO4000:NEXTI:CLS:RETURN
1150 PRINT:PRINT@M,"        1234567";
1160 FORI=1TO3
1170 M=M+32
1180 PRINT@M," ROW";I;
1190 IFA(I)<=0THENPRINT"":GOTO1210
1200 FORO=0TOA(I)-1:PRINTCHR$(252);:NEXTO:PRINT""
1210 NEXTI
1220 RETURN
1230 DATA GRANNY,LEARNER,IDIOT,NUTCASE,USELESS
1240 DATA FAIR,NOT BAD,SCHOOL BOY,OKAY,AVERAGE
1250 DATA BETTER THAN MOST,DOING WELL,GOOD PLAYER,PRETTY GOOD,ABOVE AVERAGE
1260 DATA FANTASTIC,SUPER,BRILLIANT,WELL ABOVE AVERAGE,VERY GOOD
```



From James Leigh in London

THE FOLLOWING program is written in standard Microsoft Basic and should run, or be easily converted to run, on any machines which support hexadecimal values. This program is based on the MIKBUG/SWTBUG type of memory examine/modify routines which are included in most machine code monitors, the main difference being that this version is

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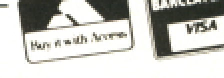
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written in Basic. The program will enable you to examine the contents of any memory location and to change the contents of the location (assuming that it is RAM).

When RUN you are asked to enter the HEX address of the memory location to be examined or altered, the computer then prints out the address in decimal and in hex. If the contents of this address are a valid ASCII character then the character will be printed, followed by the contents of the location printed in hex.

To change the memory contents type in the new value in hex, the next location will then be displayed in the same way ready for examination or modification. If no change is to be made then it is possiblle to step forward one address at a time by pressing the right arrow key. If you wish to step back then pressing the left arrow key will give access to the previous memory location in exactly the same way. Pressing the up or down arrow keys will enable you to skip backward or forwards in memory by −16 or +16 locations respectively.

If a mistake is made when modifying memory, it can be easily corrected by using shift and left arrow if it is a mistake in the first hex character, (m.sig.nibble) and re-entering the correct value. If the mistake is in the second hex character then simply use left arrow to step back and re-enter the correct value. In order to select a different address to be examined simply press the ENTER key and the program asks for the hex address of the location at which examination is to begin.

Variables

A$	Backspace character.
W$	&H for hex values.
AD$	Address of first location.
AD	Current address.
DA	Current data.
I	Current data nibble.
X$(I)	Hex input nibbles.
Nibble	Half a byte.

Program notes

Lines	
20	Get start address.
30-40	Print decimal address and hex address with leading zeros.
50-70	Format and print ASCII character and hex data.
90-140	Get command.
150-180	Backspace and print new data.
190-200	Store new data, check for RAM, notify error
210	Error correction backspace, notify that not hex error has occurred.

```
10 CLS:A$=CHR$(8)
20 PRINT:INPUT"ENTER HEX ADDRESS";ADR$:W$="&H":ADR$=W$+AD$:ADR=VAL(ADR$)
30 PRINTADR;" ";:IFADR<4096 THENPRINT"0";:IFADR<256THENPRINT"0";:IFADR<
   16THENPRINT"0";
40 PRINTHEX$(ADR);" ";
50 DA=PEEK(ADR):PRINT"-";:IF DA<32 THENPRINT"-";ELSEPRINTCHR$(DA);
60 PRINT"- ";
70 IFDA<16THENPRINT"0";HEX$(DA);" ";ELSEPRINTHEX$(DA);" ";
80 I=1       90 X$(I)=INKEY$:IF X$(I)=""THEN90
100 IFX$(I)=CHR$(9)THENADR=ADR+1:PRINT:GOTO30
110 IFX$(I)=CHR$(8)THENADR=ADR-1:PRINT:GOTO30
120 IFX$(I)=CHR$(94)THENADR=ADR-16:PRINT:GOTO30
130 IFX$(I)=CHR$(10)THENADR=ADR+16:PRINT:GOTO30
140 IFX$(I)=CHR$(13)THEN20
150 IF I=1 THEN PRINT STRING$(3,A$);
160 PRINTX$(I);:IFX$(I)="0"THEN180
170 IF VAL(W$+X$(I))=0 THEN GOTO210
180 IF I=2 THEN PRINT:GOTO190 ELSE I=2:GOTO90        190 X$=W$+X$(1)+X$(2)
200 POKEADR,VAL(X$):IF PEEK(ADR)<>VAL(X$)THEN PRINT"    not^ram":GOTO30
ELSE ADR =ADR+1:GOTO 30
210 IF X$(I)=CHR$(21)THEN PRINT:GOTO30 ELSE PRINT"_NOT HEX":GOTO30
```

Numbers

From K Garwell in Stoke-on-Trent

I HAD DIFFICULTY writing lengthy programs and not having a printer. The difficulty was simply not knowing the line numbers of each section of the program. However, I soon adopted a standard scheme. This consisted of putting all the declarations and control statements on lines 10 to 99, all the subroutines on lines 100 to 1000, and then starting each main section of the program at 'n' thousand (at 1000, 2000 and so on).

This was fine until modifications, or additions called for renumbering and then once again the line numbers were lost. A simple technique and a short piece of code solved the problem.

The technique is simply to put a REM statement in front of each subroutine and each main section naming it and if necessary making a note of its purpose. The few lines of code shown were placed right at the end of the program, hence the very high line numbers. In operation it is only necessary to call for a LIST of the program and note the last line number. A GOTO this line number will then list all the REM statements and their positions (line numbers).

Note that it is essential to use REM statements and not the abbreviation. The abbreviated form is used in line 60000 to mark the end of the program. The only other requirement is that in line 60030 LOC must be set equal to the store address +1 at which the program starts. 7681 is correct when four graphics pages are in use but must be altered if this is changed. (For example 13825 if all eight pages are in use.) Remember also that if a program has just been loaded from tape and not yet RUN, it will be sitting at 7681 whatever the PCLEAR instruction says. Alternatively omit the LOC statement from line 60030 and give the correct value in the immediate mode before the GOTO.

```
60000 'END
60010 IFPEEK(LOC+4)=130THENPRINT(PEEK(LOC+2)*256+PEEK(LOC+3));:FORI=LOC
+5TOPEEK(PEEK(LOC+4)=58THEN ENLOC)*256+PEEK(LOC+1)-1:PRINTCHR$(PEEK(I))
;:NEXT:PRINTELSEIFD
60020 LOC=PEEK(LOC)*256+PEEK(LOC+1):GOTO60010
60030 LOC=7681:GOTO60010
```

Test your reactions

From A L Witherington in Leicestershire

THIS IS a simple game to test your reactions. Use is made of the Dragon's Timer function to measure the speed of your reactions.

```
10 CLS:PRINT@199,"*-REACTION TIMER-*"
20 FOR A=1TO1000:NEXT A:T=0.5
30 CLS:PRINT@37,"THIS IS A GAME TO TEST"
40 PRINT@72,"YOUR REACTIONS"
50 PRINT@161,"PRESS THE SPACEBAR TO START,"
60 PRINT@193,"AFTER A SHORT DELAY YOU WILL"
70 PRINT@225,"HEAR A 'BEEP' AND THE YELLOW"
80 PRINT@257,"DOT WILL FALL DOWN THE SCREEN"
90 PRINT@321,"THE OBJECT OF THE GAME IS TO"
100 PRINT@353,"STOP IT AS QUICKLY AS POSSIBLE"
110 PRINT@385,"BY PRESSING THE SPACEBAR AGAIN"
120 PRINT@482,"(PRESS SPACEBAR TO CONTINUE)";
130 A$=INKEY$:IF A$=" "THEN 140 ELSE 130
140 CLS:B$=CHR$(128)+CHR$(128)+CHR$(128)
150 FOR A=3 TO 483 STEP 32
160 PRINT@A,B$;:NEXT A
170 PRINT@36,CHR$(159);
180 PRINT@41,USING"BEST TIME :££.££ SECS";T;
190 PRINT@263,"PRESS SPACEBAR TO START";
200 A$=INKEY$:IF A$=" "THEN 210 ELSE 200
210 PRINT@263,"******** READY ********";
220 FOR A=1 TO (RND(3000)+300):NEXT A
230 A$=INKEY$:IF A$=" "THEN 220
240 TIMER=0:SOUND 200,1
250 PRINT@271,"*******";
260 FOR A=68 TO 484 STEP 32
270 PRINT@A,CHR$(159);
280 FOR B=1 TO 5
290 A$=INKEY$:IF A$=" "THEN GOTO 320
300 NEXT B:NEXT A
310 A$=INKEY$:IF A$<>" "THEN 310
320 N=TIMER:Z=N/50:SOUND 200,1
330 PRINT@105,USING"YOUR TIME :££.££ SECS";Z;
340 IF Z<T THEN T=Z
350 FOR A=1 TO 500:NEXT A
360 PRINT@331,"ANOTHER TRY? (Y/N)"
370 PRINT@395,"OR INSTRUCTIONS (I)"
380 A$=INKEY$:IF A$="Y"THEN 140
390 IF A$="I"THEN 30
400 IF A$="N"THEN 410 ELSE 380
410 CLS:END
```

Transmac

From A Fyfe in Edinburgh

DRAGON OWNERS who have recently bought disk drives may find it useful to automatically transfer several programs from tape to disk in one go. The following short program and the accompanying executive (macro) file are written to do this for the Delta/Cumana system. The routine will only work with Basic program files, so there is no danger of overwriting the DOS memory in RAM during transfer. Machine code files and data files will result in error messages.

As variables are cleared during CLOAD, they must be stored in addresses at the top of RAM. I have used the address 31231 for the total number of files which are to be transferred and 31230 for the running count of files saved.

Take care when building Transmac. Type it in exactly as written as there is no way to edit an executive file (you will have to kill it and build again). If you save the Basic program on disk as "TRANSFER", it can be used by typing RUN "TRANSFER" and will work automatically on up to 10 files. When it is all over, it is best to follow the advice given in the Delta manual — load each program, remove the disk from the drive and type RUN. As the manual says, loading machine code from within a program may present problems. Alternatively, you may run out of Basic variable space (indicated by an OM error), in which case you will not be able to use this program from disk unless you prune it down.

```
10 CLEAR200,31229:CLS:PRINT@97,"TAPE-TO-DISK PROGRAMS TRANSFER"
20 PRINT:PRINT:INPUT" HOW MANY FILES TO TRANSFER";N
30 POKE31231,N:MOTOROFF
40 IF N>10 THEN PRINT:PRINT" SORRY... MAXIMUM OF TEN FILES":SOUN
D200,1:FORZ=1TO2000:NEXT:GOTO10
50 PRINT:PRINT:PRINT" INSERT TAPE AND SWITCH TO play"
60 PRINT@390,"PRESS <SPACEBAR> TO":PRINT@423,"COMMENCE TRANSFER"
70 I$=INKEY$:IFI$=""THEN70
80 POKE31230,1:DO"TRANSMAC"
```

Figure 1: The Basic tape-to-disk transfer program

```
BUILD "TRANSMAC"
TYPE 255 CHARS
CLOAD
I=PEEK(31230):FORA=1026TO1033:IF
PEEK(A)<>96THENF$=F$+CHR$(PEEK(A)):NEXT
CLS:PRINT:PRINT"SAVING ";F$:SAVE
F$:PRINT
IFPEEK(31231)>I THEN POKE31230,I
+1:DO"TRANSMAC"
CLS:PRINT:PRINTI;"PROGRAMS HAVE
BEEN SAVED":PRINT:PRINT
<BREAK>
```

Figure 2: The executive file

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Sound

From Bobby Patel in Essex

THIS PROGRAM is a sound graph to demonstrate how sound can be detected via the cassette port on the computer. When RUN, you will see a line going across the screen. You then play some music as if you were loading a normal program. You will then see the line going up or down according to the sound.

There are two PEEKs in the program. They are PEEK (65312) and PEEK (65314), detecting quiet and loud noise.

```
 10 REM SOUND GRAPH BY BOBBY PATEL AGED 12
 20 AUDIO ON
 30 PMODE, 4:PCLS:SCREEN1,1
 40 LINE(0,180),PRESET
 50 FOR X=0 TO 255 STEP 5
 60 IF PEEK(65312)=1 THEN Y=180 ELSE Y=100
 70 IF PEEK(65314)<>255 THEN Y=20
 80 LINE-(X,Y),PSET
 90 NEXT X
100 PCLS
110 GOTO40
```

Database

From John Peat in Northumberland

THIS PROGRAM is basically a small scale database which uses the power of the Dragon's file handling system to store the information contained on cassette tape.

The program allows the storage and retrieval of up to 700, 32-character strings. The name Laser is gained from the way initial letters on the menu page are built.

Once information is recorded, you can load an old datafile into tape; add to the memory file up to a maximum of 700 entries; search for an item present in strings, which, if found, will be displayed on the screen; and alter a specific entry. If your entry is too high, it is not allowed. This is most useful for spelling corrections.

Memory in this program is tight, which explains the lack of REMs and modification opportunity. Anyone wanting to make modifications should alter the amount of entries allowed in the storage room thus making more space available.

The entries are displayed on screen, one by one, from the start. You can use A to move up the entries, Z to move down them and E to end the print routine.

Program notes

Lines	
10-30	Sets up arrays and string space.
40-130	Displays and INKEYs the menu page.
140-280	Routine to add to the file.
290-430	Routine to save the file in memory.
440-570	Routine to load the old file from the tape.
580-740	Routine to print out parts of the file.
750-890	Routine to search for items in the file.
900-1010	Routine to alter entries.

There are no MOTOR statements in the program as my cassette has no REM plug, so if they are necessary they should be added to existing lines to save memory space.

```
10 PCLEAR1
20 CLEAR24000
30 DIMA$(700)
40 CLS
50 PRINT@32,"PRESS 1 TO LOAD OLD FILE"
51 PRINT@70,"a TO ADD TO FILE"
52 PRINT@102,"s TO SAVE NEW FILE"
53 PRINT@134,"e TO ALTER ENTRIES"
54 PRINT@166,"r TO SEARCH FOR ENTRIES"
55 PRINT@198,". TO PRINT FILE."
60 Z$=INKEY$
70 IFZ$="A"THEN140
80 IFZ$="S"THEN290
90 IFZ$="L"THEN440                100 IFZ$="."THEN580
110 IFZ$="R"THEN750
120 IFZ$="E"THEN900
130 GOTO60
140 IFNO>699THEN250
150 CLS:PRINT@32,"ENTRY";NO;"MAX. 32 CHARS."
160 PRINT@96,"":LINEINPUTA$(NO)
170 IFLEN(A$(NO))>32THEN150
180 NO=NO+1
190 PRINT@448,"PRESS N TO CONTINUE OR T TO END.";
200 Z$=INKEY$
210 IFZ$=""THEN200                220 IFZ$="N"THEN150
230 IFZ$="T"THEN40
240 GOTO200
250 CLS:PRINT"NO ROOM PRESS SPACE"
260 Z$=INKEY$
270 IFZ$<>" "THEN260
280 GOTO40
290 CLS:INPUT"ENTER FILE NAME";F$
300 CLS:INPUT"ENTER NO. OF COPIES";NC
310 FORND=1TONC
320 CLS:PRINT@32,"SAVING FILE";ND;"OF";NC
330 OPEN"O",£-1,F$
340 FORN=0TONO                    350 PRINT£-1,A$(N)
360 NEXT
370 CLOSE£-1
380 FORT=0TO3000:NEXT
390 NEXTND
400 CLS:PRINT"FILE SAVED PRESS SPACE"
410 Z$=INKEY$
420 IFZ$<>" "THEN410
430 GOTO40
440 CLS:INPUT"FILE NAME";F$
450 CLS:PRINT"LOADING FILE ":F$
460 OPEN"I",£-1,F$
470 N=0
480 IFEOF(-1)THEN520
490 INPUT£-1,A$(N)
500 N=N+1
510 GOTO480
520 CLOSE£-1
530 NO=N-1
540 CLS:PRINT"FILE LOADED PRESS SPACE"
550 Z$=INKEY$
560 IFZ$<>" "THEN550                         570 GOTO40
580 IFNO=0THEN710
590 CLS:INPUT"START POS.";SP
600 CLS:MN=SP
610 PRINT@96,"ENTRY";MN
620 PRINT@160,A$(MN)
630 PRINT@224,"PRESS Au - Zd - Ee"
640 Z$=INKEY$
650 IFZ$="A"THENMN=MN+1
660 IFZ$="Z"THENMN=MN-1
670 IFZ$="E"THEN40
680 IFMN<0THENMN=0
690 IFMN>NO THEN710
700 GOTO610
710 CLS:PRINT"PRINTOUT OVER, PRESS SPACE"
720 Z$=INKEY$
730 IFZ$<>" "THEN720                         740 GOTO40
750 CLS:INPUT"ENTER ITEM TO SEARCH FOR.";IS$
760 FORZ=0TONO
770 IFINSTR(1,A$(Z),IS$)<>0THENGOSUB830
780 NEXT
790 CLS:PRINT"ITEM NOT FOUND, PRESS SPACE"
800 Z$=INKEY$
810 IFZ$<>" "THEN800
820 GOTO40
830 CLS:PRINT"ENTRY NO.";Z
840 PRINT@64,A$(Z)
850 PRINT@128,"CONTINUE ? c END ? e"
860 Z$=INKEY$
870 IFZ$="C"THENRETURN
880 IFZ$="E"THEN40                           890 GOTO860
900 CLS:INPUT"ENTRY TO BE CHANGED";CE
910 IFCE<0ORCE>NO THENPRINT"TOO LARGE":GOTO970
920 CLS:PRINT"OLD ENTRY"
930 PRINT@64,A$(CE)
940 PRINT@128,"NEW ENTRY"
950 PRINT@192,"":INPUTA$(CE)
960 IFLEN(A$(CE))>32THEN920
970 PRINT@448,"PRESS c TO CONTINUE OR e TO END.";
980 Z$=INKEY$
990 IFZ$="C"THEN900
1000 IFZ$="E"THEN40
1010 GOTO980
```

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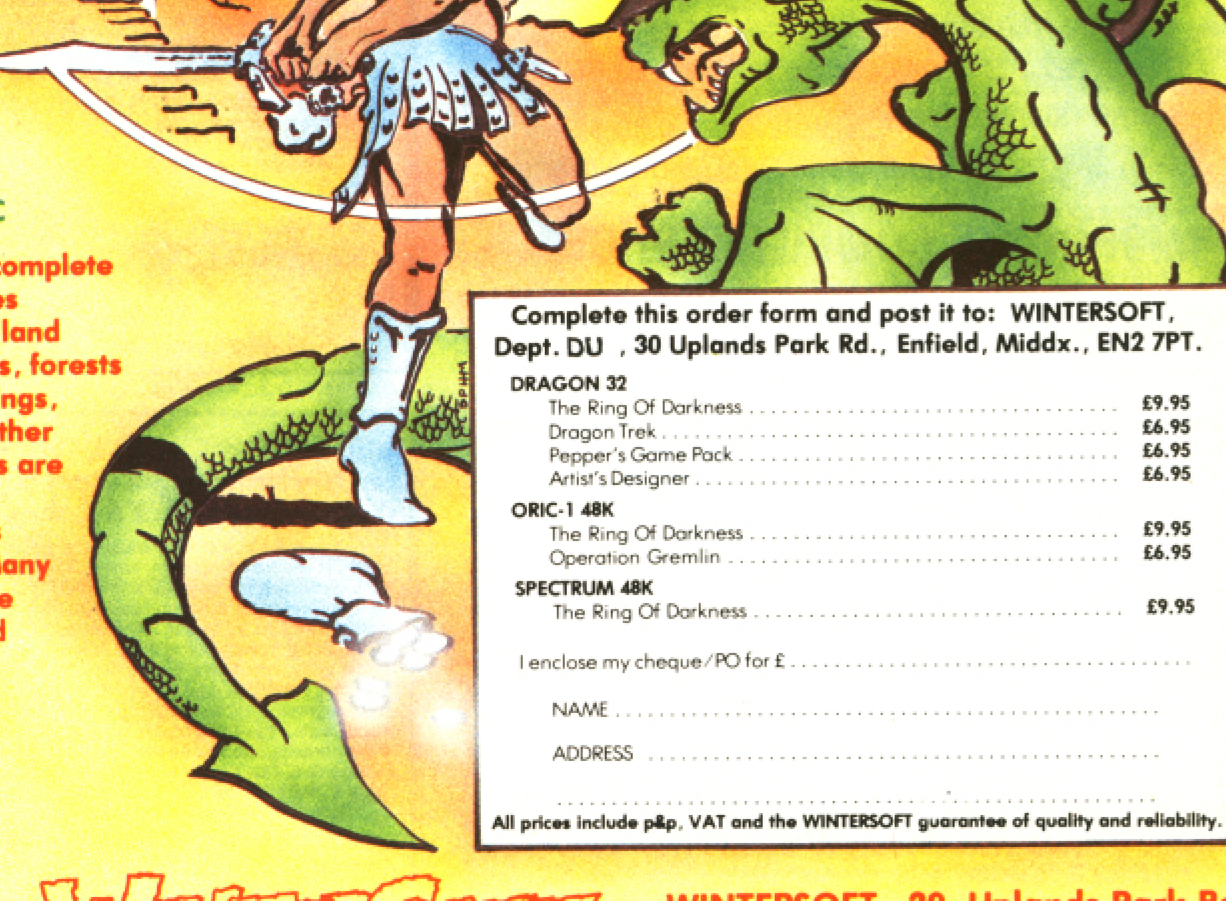
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If you've got a technical question or problem write to Brian Cadge at *Dragon User*. Please do not send a SAE as Brian cannot guarantee to answer individual inquiries.

Dragon Answers

Jammed up with RAM

VARIOUS ARTICLES that I have read have suggested that the Dragondos system uses up most of the available RAM in the Dragon 32 and that a Dragon 64 would be necessary in order to use it.

However, the review of disk systems in *Dragon User* makes no mention of the amount of RAM used. I would be very grateful to have your comments regarding this aspect of the Dragondos and the Delta systems.

C A Elyard,
Hixon,
Stafford.

BOTH THE Dragondos and Delta Dos are very similar in the amount of memory space used — both are in cartridge form and so occupy the cartridge memory (8K from 49152). Obviously, some RAM is needed for buffers and system variables and again both systems use only 1½K (about 1536 bytes) of RAM. For example on power up of the Dragondos you get 23335 free bytes plus the usual 4 graphics pages, so very little RAM is actually used.

Where the systems differ is that the Dragondos uses RAM from address 1536 and moves all graphics pages up one, and the Delta Dos uses reserved memory at the top of RAM and doesn't alter the graphics, etc.

You will need a 64K Dragon to run Dragon Data's new OS9 software as, with this, an operating system is BOOTed into memory and then all ROMs are paged out leaving clear RAM for the disk software. However, this is only likely to interest small business users to any extent.

Addressing a problem

I WONDER if you could help me with the following problem.

How could I switch on and off a machine-code utility program like the Keybeep program in a previous issue of *Dragon User*, using maybe something like KBON (KeyBeep On)/KBOFF (KeyBeep Off) without having to keep on typing POKE &HI6A, &H7E/POKE &HI6A, &H39?

More than likely this would need another machine code program and this program may interfere with the Keybeep program.

P A Norris,
Sandford,
Hampshire.



IT IS quite simple to add new commands to the Dragon Basic provided you have a fair knowledge of machine code. The addresses you need to know are:

298 = Number of new commands

299/300 = Address of list of new words (the last letter of each word ends with bit 7 set, ie add 128).

301/302 = Address of despatch routine. When a new command is encountered its code will be in the A register and the Basic will jump to this address to be despatched to the new routine.

Similar addresses apply for the addition of new functions although more care is needed to add them. These addresses are 303 to 307.

Note that as this is the method cartridges use to extend the Basic you cannot add two sets of new commands, and so this method cannot be used with, for example, a disk system operating.

Moving upwards

I HAVE a couple of questions relating to the Dragon 32. Firstly, after reading the article in the January issue of *Dragon User* on upgrading the Dragon to 64K, I am considering having my Dragon upgraded by Microcare. However, if this were done, would it still be possible to use an Edit+ cartridge and Telewriter package without difficulty?

Secondly, whilst using Telewriter, I occasionally find difficulty in reloading saved data files as the leader signal generated by the Dragon is either too weak or partially recorded whilst the rest of the data is well recorded. Therefore, is there a way of improving the strength of the leader signal?

J E Thomas
Andover
Hants

WITH 64K upgrades and the official Dragon 64 it is quite possible to use cartridges, but this only allows you access to 32K of memory unless they are paged out (together with the Basic ROM) to give a 64K soft machine.

The length of the cassette leader can be altered by location 144. Before using Telewriter, type POKE 144,4 and this should prevent any further problems with saving and loading files.

Adding code

THE CLOAD command has the effect of erasing from memory any code previously input or loaded. What I would like to be able to do is append to some code already in memory, more code from tape. Is this possible?

David Sherry
East Hamingfield
Chelmsford

THE METHOD required to append programs is shown below and this should work with most Basic programs.

1: CLOAD first program
2: POKE 180, PEEK (25)
POKE 181, PEEK (26)
POKE 25, PEEK (27)
POKE 26, PEEK (28) — 2
3: CLOAD next progam
4: Renumber this if necessary
5: POKE 25, PEEK (180)
POKE 26, PEEK (181)
6: Goback to step 2 if more programs are to be appended.

Locations 25 and 26 hold the start address of the Basic program, locations 27 and 28 the start of the variable space. Locations 180 and 181 are just used as temporary stores here and are normally used for high-res graphics work.

CSAVE command

THE DRAGON 32 manual quotes a command CSAVE "filename",A which "saves data in ASCII format", without further explanation. Which data does it save, and how are they identified? Isn't everything saved in ASCII format anyway?

What is the effect of the reset button (not the reset command)? Is it any different from switching off and on again, apart from the fact that the copyright lines don't appear?

Ruben Hadekel
London

ON YOUR first point, the CSAVE "",A command does the equivalent of a LIST to the cassette recorder. That is, the Basic program currently in RAM is saved to tape in ASCII data format and this can then be read back in, either using CLOAD or INPUT#−1. The normal CSAVE command saves the Basic program in tokenised form which saves memory and tape. This is the form that the program exists in in RAM. Try the following to see for yourself:

PCLEAR 4:FOR I = 7680 TO 8000: ?CHRS (PEEK(I));: NEXTI

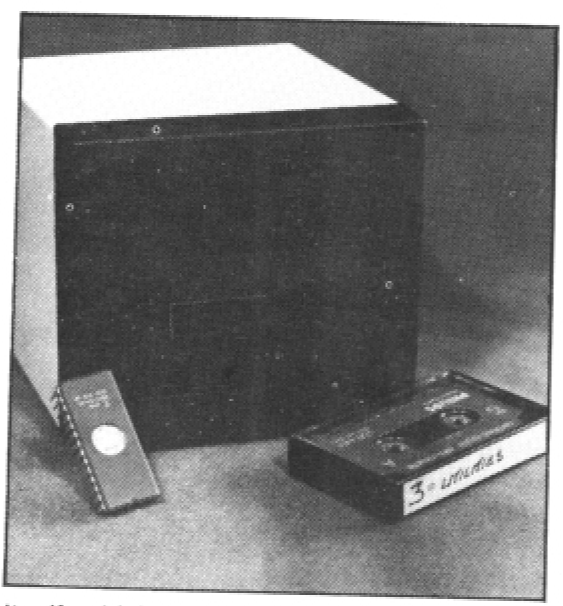
The reset button is connected to the reset pin on the 6809 CPU and when pressed causes the reset routine to be executed. This routine simply resets the Basic and CPU stacks and restores text mode returning to command mode. It doesn't have the same effect as switching off then on as the Basic vectors are not initialised. If you type POKE 113,0 before pressing reset then you can simulate switching off and on by doing a cold start.

Competition Corner

Answers to Competition Corner, *Dragon User*, 12/13 Little Newport Street, London WC2R 3LD

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*Find the highest number of primes in **Gordon Lee's** puzzle*



TO WHET YOUR appetite for this month's competition I have devised a computation for you to solve.

I have a sheet of newspaper. At 12 noon I tear the paper in two halves. Fifteen minutes later I tear the two pieces into four, and 15 minutes after that I tear the four into eight. I repeat this procedure every quarter of an hour until midnight. If I then pile the pieces of paper one on top of the other, how high will this pile be?

To obtain the answer, assume that there is a thickness of 100 sheets to the inch and run this program:

```
10 T = 2
20 FOR N = 1 TO 48
30 T = T * 2
40 NEXT N
50 PRINT "HT. of PILE IS;";
   T/(100 * 63360); "MILES"
```

This gives the answer of over 88 *million* miles — almost the distance from the earth to the sun. As you can see, the computer tackles the problem by doubling the value T, 48 times. This represents the number of pieces of paper produced, and the total is then divided by 100 * 63360 to arrive at the number of miles in the answer. To see how the computer handles such large numbers add the line:

```
35 PRINT N,T
```

and run the program again. This will show the effect on the value T, as it is repeatedly doubled.

Overflow

The maximum number of digits that the Dragon can handle as a variable is nine, so once T has exceeded this another form of notation has to be used to express the larger order of numbers, otherwise an overflow situation would result. Consequently, the computer switches automatically to scientific or exponential notation, and for example, the first value listed in this form will be:

1.07374182E + 09

The E + 09 means that to obtain the true value the decimal point should be moved nine places to the right. Similarly, the final value in the list is:

5.62949954E + 14

which would need to have the decimal point moved 14 places to the right. This represents an actual value of:

562949954000000 (to an accuracy of nine significant figures.)

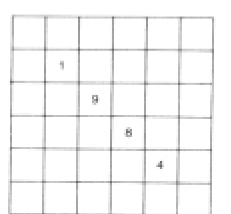
The computer then divides this figure by 100 * 63360 — to arrive at the answer in *miles*. This division brings the final value down to within the range that the computer can display conventionally, so it switches back automatically to ordinary notation and displays the answer as 88849424.5.

Note the plus sign immediately after the 'E' when figures are displayed in exponential notation. Very small numbers have a minus sign, which indicates that the decimal point should be moved to the left. So 4E-12 is the same as 000000000004. Remember that the sign refers only to the exponential part, and not to the number itself, which can be positive or negative in its own right. Also, take care not to confuse this form of exponentiation with the computer's EXP or inverse log function!

Usually, when large or small numbers are referred to in print they are expressed as a decimal multiplied by a certain power of 10, for example, the distance of the star Alpha Centauri may be given as 2.249×10^{13} miles. This is exactly the same as 2.249E + 13, in the notation that we have just been discussing.

Finally, consider the number 1 E + 38. On page 144 of the Dragon manual you will see the overflow error code OV, which occurs when the computer attempts to handle a value larger than this figure. But how large is 1E+38? It is difficult to imagine such a number. Even writing it in full (1 followed by 38 zeros) will probably be just as confusing. As a comparison, the remotest object so far detected in the universe is at a distance of 14,500 million light years. This is equivalent to approximately 5.4E + 27 inches, a figure well within the capability of the Dragon. Now, on to the competition.

Readers are probably familiar with the "Wordsearch" puzzles found in magazines, where words are interlocked into a grid. This month's competition involves compiling such a grid, but using digits rather than letters. The grid is as shown with four digits already entered in place.



The object of the competition is to fill the grid with as many *prime numbers* as possible. The numbers can read in any direction — up, down, left to right, right to left, or diagonally, as in conventional wordsearch puzzles, but, of course, only in a straight line. The turning of corners is not allowed. For example, the four-digit sequence 6719 would contain the primes 67, 71, 19, 719 and 6719 in one direction and the prime 17 in reverse, as well as the single digit primes 1 and 7. **How many primes can you find counting each prime only once, even though it may appear in the grid several times?**

Prize

USERS WHO are tired of storing their data on cassette recorders but can't afford to move up to disk drives now have the Ultra Drive to turn to.

This drive provides high speed storage at a read/write speed of 1,200 characters/second, with a capacity of about 200K per cassette. It is completely automatic and is based on Philips' mini digital cassette recorder. And Ikon Computer Products is offering one free to the winner of this month's competition.

Rules

TO WIN this month's prize you must copy your completed grid onto a sheet of paper and then list clearly all the primes that you have found. At the top of the page state clearly the number of primes that you are claiming. The winner will be the entrant with the highest score. Please do not send in a cassette containing the answer.

Your entry must arrive at *Dragon User* by the last working day in May. The names of the winners, and the solution to the puzzle, will be published in our August issue. You may only enter the competition once. Entries will not be acknowledged and we cannot enter into correspondence on the result.

February winners

THE WINNERS of February's competition are D Clee of Penn, Wolverhampton and P J Warburton of Wrexham, Clwyd. They each receive a package of software from JCB Microsystems for correctly stating that Bryan made the incorrect statement and that the others began the game with the following numbers: Annabel (189), Chrissie (185) and Daniel (71). The package from JCB consists of its Sound and Speech Synthesis Extension Modules, a utilities program which speeds up Basic, and the arcade game Basil Goes Ballooning.

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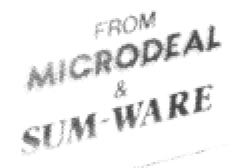
CONTROLLED PRINTING FORMATS?? OF COURSE...tell **FILMASTR** which records to use which fields to print and in what order. You can control the print location to any position on the page.

MAILING LABELS?? NO PROBLEM.

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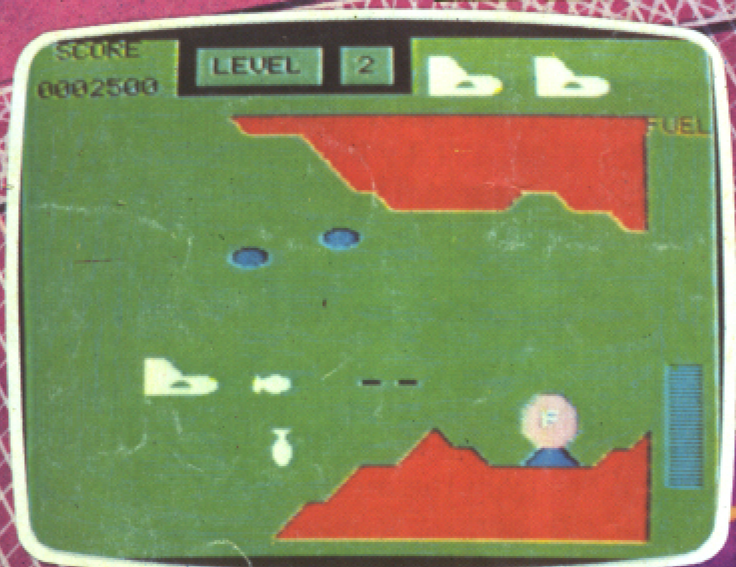
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Actual picture of screen on
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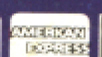
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